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A Study to Measure
Nursing Activity and Productivity
to Identify Potential Benefits
in Preparation for the
Implementation of Hospital Information Systems

A Graduate Research Project
Submitted to the Faculty of
Baylor University
In Partial Fulfillment of the
Requirements for the Degree
of
Master of Health Administration
by
Captain Leah Ward-Lee

July 1989

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"REPRODUCED AT GOVERNMENT EXPENSE"

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DEPARTMENT OF THE ARMY
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REPLY TO
ATTENTION OF:

HSHE-ADR

13 July 1989

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MEMORANDUM THRU CHIEF OF STAFF, BROOKE ARMY MEDICAL CENTER, FORT SAM HOUSTON,
TX 78234-6200

FOR RESIDENCY COMMITTEE, U.S. ARMY BAYLOR UNIVERSITY GRADUATE PROGRAM IN
HEALTH CARE ADMINISTRATION (HSHA-IHC), ACADEMY OF HEALTH SCIENCES,
U.S. ARMY, FORT SAM HOUSTON, TX 78234-6100

SUBJECT: Graduate Management Project

In accordance with the instructions contained in the Administrative Residency
Manual, subject project is submitted for CPT Leah Ward-Lee, Administrative
Resident, Brooke Army Medical Center, Fort Sam Houston, Texas 78234-6200.

Encl

Leah Ward-Lee
LEAH WARD-LEE
Captain, MS
Administrative Resident

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WORKS CITED

CHAPTER 1: INTRODUCTION

CONDITIONS THAT LED TO THE SELECTION OF THIS TOPIC

Implementation of computer information technology changes not only the information available to a hospital staff, but the workflow associated with its use. Although the technology has continually improved, the ability to implement this technology has not kept pace. A visit to almost any hospital that has some form of automated support will confirm the idea that just because there is an installed computer system does not mean there is necessarily a utilized or implemented system. The degree of implementation can be viewed as a continuum ranging from not using a system at all to full implementation. Along that continuum is a point where there is still a requirement for manual data entry of data that has been produced by another computer. At another point on the continuum, reports generated by the system are rewritten in another format. Even though the information generated by the system may provide the capability to make better decisions and interventions, the management engineering process that must take place to reassess the total workflow has not kept pace.

This management engineering process, when coupled with the interpersonal work that must be done to change the behavior of the workers involved with a system is termed 'benefits realization', for the purposes of this study. Benefits realization involves the study of not only how workers do their

work, but the optimum method of doing it.

Research conducted in 1981 (Cook et al as referenced in Zielstorff 1985, 23), ten years after the installation of a system at El Camino Hospital, used the technique of comparing this hospital to other hospitals without management information systems. This study found that much of the benefit of the installation of a computer system may be due to the management engineering program (Zielstorff 1985, 23). This study also added one more dimension--when measuring the amount of time spent by nurses it was found that even though there was a decrease in the amount of time required to perform clerical tasks, there was no corresponding increase in the amount of time spent in direct nursing care. This suggests that if there is not a benefits realization program, time made available in one area because of the installation of a computer system may not be invested back where it is needed.

This is supported by Glazer, Drazen, and Cohen in their article that appeared in the Journal of Medical Systems. They state that only "one-third of all potential benefits occur automatically or with limited management intervention." The other two-thirds of the benefits require effort and planning and are usually those with the largest efficiency and effectiveness implications (1986, 51). Correll (1985, 22) supports this idea, and reports that hospitals have found sustained management engineering efforts, that include reorganizing the workflow and

rewriting procedures, are required to realize the benefits of a system.

This changes the way that the cost of a computer system should be estimated. Traditionally only hardware, software, training, installation, and maintenance costs are calculated. Implementation costs, other than the initial file and table build, are recognized but not usually considered and in some circumstances show up as cost overruns. The time required to complete the implementation show up as project delays. The traditional system implementation involves some time where both the manual and portions of the automated system are operated with increasing sections of the automated system added, tested, and the corresponding manual portion discontinued, at least in theory. In actuality many times the manual system is not discontinued either because the automated system is not reliable or it does not satisfy the information requirements of the users. This has certainly contributed to weakened the initial euphoria on the part of management that the implementation of a computer system will reduce the number of personnel required in a work center. Conversely it has not completely reassured the worker that he will not be replaced or displaced by the computer system.

There are serious efforts to try to quantify a method of determining the cost/benefit of computer systems. In the healthcare industry, it is becoming essential, not only to ensure that the system is cost effective but that decision-makers are

able to calculate the benefit in terms of increased productivity or cost avoidance when making the decision to implement a system. Richard A. Correll, President of California Health Management Systems, in an interview published in Health Care Strategic Management (Correll 1985, 22) states that it is important to be able to calculate the rate of return on new technology. He also supports the idea that hospitals have found that sustained management engineering efforts, which include reorganizing the workflow and rewriting procedures, are required to realize the benefits of a system. Leo W. Di Giulio and Tim K. Zinn (1987, 23) state that the constraints of decreasing revenue brought about because of the prospective payment system have caused hospitals to evaluate capital expenses differently. Any project that is capital intensive must also be cost reducing to be considered, including hospital information systems.

They conducted a study that analyzed 4,000 activities within 26 departments of one 250 bed hospital and found that 33 percent of all activities were devoted to managing data, not patients. Of those activities, almost 90 percent were involved with either forms processing, record keeping or phone communications (20). They recognize that any benefit achieved through automation is not inherent in the technology, but depends on the institution's willingness to change the basic way things are done (23).

Paul R. Vegoda and Ellen Vanacore (1986, 11-23) echo Di Giulio and Zinn's evaluation of the problems faced by hospitals

today, but go further to say that the use of a fully integrated hospital information system may be the only way a hospital has to manage the information it needs to remain solvent. Although they assert that a cost-benefit study must be completed to determine the institution's potential return on investment, their study, which evaluated the system installed at the University Hospital at the State University of New York, was conducted after the system was installed. This was one of the few studies that quantified the value of a system. This was done by comparing the expenses at the hospital with expenses at like hospitals and determining what costs had been avoided by having the system. However, it was done after installation. This coincides with Bender's assertion (Journal of Management Information Systems 1986, 22) that the cost-benefit of information processing is, at best, determined "post facto".

Since the number of nurses assigned to patient care duties at a hospital can be the critical element in the mix of the number and acuity of patients that can be treated, it is essential that the systems installed are those that are cost effective in terms of the utilization of nurses' time.

Additionally, to successfully implement a computer system, there must be enough of a perceived benefit to induce a staff to utilize the capabilities of the system that are made available. This is particularly difficult at this juncture because many of the automated systems proliferated to military hospitals, have

provided no direct benefit to the hospital staff, but have required extensive data entry; therefore, this perception is difficult to overcome.

APPLICATION TO THE MILITARY HEALTHCARE SYSTEM

The idea that computer systems must be cost effective and that there must be a method of measuring that benefit has implications that are applicable to the military healthcare system. The implementation of computer systems within the military healthcare system has as one of its primary goals, the reduction in the routine administrative tasks being performed by healthcare providers so that they may be available to provide additional patient care. As part of this goal, the quality of the care currently being provided has the opportunity to be enhanced when the healthcare provider has the all available information about the patient he is treating.

The Project Manager for the Composite Health Care System, the standard hospital information system that is being deployed to the Department of Defense Hospitals, must continually compete for funding at Congressional level. One of the contributing factors is that while the benefits of the system can be modeled, there is not enough experience with the system yet to provide the bottom line dollar figures as to what the savings will be. Some of the components of the measurement will be readily attainable. The change in the number of statements of nonavailability (while controlling for the number of providers assigned), and the

associated change in the costs in the Civilian Health Program of the Uniformed Services (CHAMPUS) is one example. The change in the number of lawsuits settled due to poor documentation in the patient record is another example. The information concerning a change in the number of medication errors should be reduced as a byproduct of physician orders being typed and the checking of drug interaction and contraindication at the time of order should show a change in the care provided and can be quantified. The decrease in the number of laboratory tests ordered because the information is available can also be collected, but will require a more subtle control.

What will be more difficult to measure is the change in the way staff spend their time, hopefully, an increase in the amount of time spent performing direct care tasks and a decrease in the amount of time spent in indirect care. Before this change can take place, the way staff currently spend their time must be understood.

This paper will examine how nursing time is currently utilized and compare the results to the study currently accepted as the baseline for measuring indirect care time in the Department of Defense. The potential benefit that is achievable from the installation of a computer system in terms of changes in the use of nursing time will be discussed as will the management engineering that must be done prior to the implementation of a system.

STATEMENT OF THE PROBLEM

To examine the potential for decreasing indirect care time by measuring the ratio of direct to indirect care on two intensive care units and identifying potential methods of reducing indirect care time.

To examine current intensive care unit staffing levels to determine if the current staffing practices are related to patient acuity or number of patients.

OBJECTIVES

1. Conduct a literature review pertaining to
 - a. Measuring nursing activity
 - b. Nursing productivity
 - c. Benefits realization programs.
2. Determine what percent of time is currently utilized for direct, indirect, and unavailable for care time. Complete a correlation matrix and analyze the significant relationships.
3. Compare the percentages of direct care, indirect care, unavailable for care, and slack time from this study to the results of the Misener Study.
 - a. Compare the percentages of direct care, indirect care, and unavailable for care time in this study to the percentages for each category in the Misener study for the total study population, that portion attributable to BAMC, and that portion attributable to BAMC critical care. Test the null hypothesis: percentages of direct care, indirect care, and unavailable for

care time for that portion of the Misener data attributable to BAMC critical care units are not significantly different than to the percentages of direct care, indirect care, and unavailable for care time for the current study.

b. Compare the percentages of each category of **indirect care time** in this study to the percentages for each category in the Misener study for the total study population, that portion attributable to BAMC, and that portion attributable to BAMC critical care. Test the null hypothesis: The percentages of each category of indirect care time for that portion of the Misener data attributable to BAMC critical care units are not significantly different than the percentages of each category of indirect care time in the current study.

c. Compare the percentages of the components of **unavailable for care time** in this study to the percentages in the Misener study for the total study population, that portion attributable to BAMC, and that portion attributable to BAMC critical care. Test the null hypothesis: percentage of time unavailable for care for the Misener study for BAMC critical care data is not significantly different than the percentage of time unavailable for care in the current study.

d. Test the null hypothesis: percentage of **slack time** for the Misener study for BAMC critical care data is not significantly different than the percentage of slack time in the current study.

3. Analyze the percentage of time spent by each provider category in each temporal category.

a. **Headnurses.**

- Compare the percentages of the components of direct, indirect, and unavailable care time for **headnurses** in this study to the percentages in the Misener study for the total study population and that portion attributable to BAMC. Test the null hypothesis: percentage of direct, indirect, and time unavailable for care for headnurses in the Misener study is not significantly different than the percentage of direct, indirect, and time unavailable for care for headnurses in the current study.

- Compare the components of indirect care time for **headnurses** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of indirect care time for headnurses in the current study is not significantly different than the percentage of the temporal categories of indirect care time for headnurses in the Misener study or in that portion of the Misener data attributable to BAMC.

- Compare the components of time unavailable for care for **headnurses** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of time unavailable for care for headnurses in the current study is not

significantly different than the percentage of the temporal categories of time unavailable for care for headnurses in the Misener study or in that portion of the Misener data attributable to BAMC.

- Test the null hypothesis: percentage of slack time for **headnurses** in the Misener data for BAMC critical care is not significantly different than percentage of slack time in the current study.

b. **Wardmasters.**

- Compare the percentages of the components of direct, indirect, and unavailable for care time for **wardmasters** in this study to the percentages in the Misener study for the total study population and that portion attributable to BAMC. Test the null hypothesis: percentage of direct, indirect, and unavailable for care time for wardmasters in the Misener study is not significantly different than the percentage of direct, indirect, and unavailable for care time for wardmasters in the current study.

- Compare the components of indirect care time for **wardmasters** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of indirect care time for wardmasters in the current study is not significantly different than the percentage of the temporal categories of indirect care time for wardmasters in the Misener

study or in that portion of the Misener data attributable to BAMC.

- Compare the components of time unavailable for care for **wardmasters** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of time unavailable for care for wardmasters in the current study is not significantly different than the percentage of the temporal categories of time unavailable for care for wardmasters in the Misener study or in that portion of the Misener data attributable to BAMC.

- Test the null hypothesis: percentage of slack time for **wardmasters** in the Misener data for BAMC critical care is not significantly different than percentage of slack time for wardmasters in the current study.

c. **Wardclerks.**

- Compare the percentages of the components of direct, indirect, and unavailable for care time for **wardclerks** in this study to the percentages in the Misener study for the total study population and that portion attributable to BAMC. Test the null hypothesis: percentage of direct, indirect, and unavailable for care time for wardclerks in the Misener study is not significantly different than the percentage of direct, indirect, and unavailable for care time for wardclerks in the current study.

- Compare the components of indirect care time for **wardclerks** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of indirect care time for wardclerks in the current study is not significantly different than the percentage of the temporal categories of indirect care time for wardclerks in the Misener study or in that portion of the Misener data attributable to BAMC.

- Compare the components of time unavailable for care for **wardclerks** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of time unavailable for care for wardclerks in the current study is not significantly different than the percentage of the temporal categories of time unavailable for care for wardclerks in the Misener study or in that portion of the Misener data attributable to BAMC.

- Test the null hypothesis: percentage of slack time for **wardclerks** in the Misener data for BAMC critical care is not significantly different than percentage of slack time for wardclerks in the current study.

d. **Registered Nurses.**

- Compare the percentages of the components of direct, indirect, and unavailable for care time for **registered nurses** in

this study to the percentages in the Misener study for the total study population and that portion attributable to BAMC. Test the null hypothesis: percentage of direct, indirect, and unavailable for care time for registered nurses in the Misener study is not significantly different than the percentage of direct, indirect, and unavailable for care time for registered nurses in the current study.

- Compare the components of indirect care time for **registered nurses** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of indirect care time for registered nurses in the current study is not significantly different than the percentage of the temporal categories of indirect care time for registered nurses in the Misener study or in that portion of the Misener data attributable to BAMC.

- Compare the components of time unavailable for care for **registered nurses** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of time unavailable for care for registered nurses in the current study is not significantly different than the percentage of the temporal categories of time unavailable for care for registered nurses in the Misener study or in that portion of the Misener data attributable to BAMC.

- Test the null hypothesis: percentage of slack time for **registered nurses** in the Misener data for BAMC critical care is not significantly different than percentage of slack time for registered nurses in the current study.

e. **Licensed Practical Nurses.**

-. Compare the percentages of the components of direct, indirect, and unavailable for care time for licensed practical **nurses** in this study to the percentages in the Misener study for the total study population and that portion attributable to BAMC. Test the null hypothesis: percentage of direct, indirect, and unavailable for care time for licensed practical nurses in the Misener study is not significantly different that the percentage of direct, indirect, and unavailable for care time for licensed practical nurses in the current study.

- Compare the components of indirect care time for **licensed practical nurses** in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of indirect care time for licensed practical nurses in the current study is not significantly different than the percentage of the temporal categories of indirect care time for licensed practical nurses in the Misener study or in that portion of the Misener data attributable to BAMC.

- Compare the components of time unavailable for care for **licensed practical nurses** in the current study to the Misener

study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of time unavailable for care for licensed practical nurses in the current study is not significantly different than the percentage of the temporal categories of time unavailable for care for licensed practical nurses in the Misener study or in that portion of the Misener data attributable to BAMC.

- Test the null hypothesis: percentage of slack time for **licensed practical nurses** in the Misener data for BAMC critical care is not significantly different than percentage of slack time for licensed practical nurses in the current study.

f. **Practical Nurse Specialists, 91C's.**

- Compare the percentages of the components of direct, indirect, and unavailable for care time for **practical nurse specialists 91C's** in this study to the percentages in the Misener study for the total study population and that portion attributable to BAMC. Test the null hypothesis: percentage of direct, indirect, and unavailable for care time for 91C's in the Misener study is not significantly different that the percentage of direct, indirect, and unavailable for care time for 91C's in the current study.

- Compare the components of indirect care time for **practical nurse specialists, 91C's**, in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of

the temporal categories of indirect care time for practical nurse specialists, 91C's in the current study is not significantly different than the percentage of the temporal categories of indirect care time for practical nurse specialists, 91C's, in the Misener study or in that portion of the Misener data attributable to BAMC.

- Compare the components of time unavailable for care for practical nurse specialists, 91C's in the current study to the Misener study and to that portion of the Misener data attributable to BAMC. Test the null hypothesis: percentage of the temporal categories of time unavailable for care for practical nurse specialists, 91C's, in the current study is not significantly different than the percentage of the temporal categories of time unavailable for care for practical nurse specialists, 91C's, in the Misener study or in that portion of the Misener data attributable to BAMC.

- Test the null hypothesis: percentage of slack time for practical nurse specialists in the Misener data for BAMC critical care is not significantly different than percentage of slack time for practical nurse specialists in the current study.

4. Analyze the relationships between selected variables of interest: direct, acuity, and shift.

5. Analyze the relationship between the variables to determine the predictors of direct care time.

a. Test the null hypothesis: Differences in acuity have no effect on the amount of direct care time.

b. Test the null hypothesis: A change in the amount of clerical time has no effect on direct care time.

c. Test the null hypothesis: Provider category has no effect on direct care time.

6. Compare the percentages of direct care, indirect care, and unavailable for care hours on two medical intensive care units.

a. Test the null hypothesis: direct care time on Unit 1 is not significantly different than direct care time on Unit 2.

b. Test the null hypothesis: indirect care time on Unit 1 is not significantly different than indirect care time on Unit 2.

c. Test the null hypothesis: unavailable for care time on Unit 1 is not significantly different than unavailable for care time on Unit 2.

d. Test the null hypothesis: acuity on Unit 1 is not significantly different than Unit 2.

e. Test the null hypothesis: clerical time on Unit 1 is not significantly different than clerical time on Unit 2.

f. Test the null hypothesis: time spent preparing supplies and equipment on Unit 1 is not significantly different than on Unit 2.

g. Test the null hypothesis: time spent in conference on Unit 1 is not significantly different than time spent in

conference on Unit 2.

h. Test the null hypothesis: Wait time on Unit 1 is not significantly different than wait time on Unit 2.

i. Test the null hypothesis: Personal time on Unit 1 is not significantly different than Unit 2.

j. Test the null hypothesis: Percent of Agency Nurses on Unit 1 is not significantly different than Percent of Agency Nurses on Unit 2.

k. Test the null hypothesis: Percent of Registered nurses on Unit 1 is not significantly different than percent of registered nurses on Unit 2.

l. Test the null hypothesis: Percent of Paraprofessional nurses on Unit 1 is not significantly different percent of paraprofessional nurses on Unit 2.

7. Produce a picture of current staffing levels on two intensive care units.

a. Build and analyze a composite of current staffing by category of nursing personnel.

b. Build and analyze a composite of the nurse to patient ratio for registered nurses and paraprofessional nurses.

c. Compare the current staffing to the staffing authorized by the Workload Management System for Nursing.

8. Analyze any automated support available on the units to determine whether or not it could be used to reduce indirect care time.

CRITERIA

The data will be collected on two intensive care units at Brooke Army Medical Center.

All statistical analyses will be tested for significance at the 95% confidence level, or restated, the probability must be less than .05 that the results are due to chance.

ASSUMPTIONS

The assumption is made that the methodology used by Misener et al was the same methodology adapted by the current researcher. To decrease the probability that there would be differences the definitions for each category of care were utilized as was the data collection format.

This is essential to the conclusions drawn in the study because the Misener data becomes the baseline or time one data and the current data are time two.

LIMITATIONS

The researcher is not an expert in the area of nursing productivity. To compensate for this limitation, the researcher did not try to evaluate if direct care time was appropriate or if time being spent with a patient was direct care time. In gathering the data used in this study, direct care time was awarded if a nurse was with a patient or with the patient's family, regardless of what the nurse was doing.

REVIEW OF THE LITERATURE

Measuring Nursing Activity

The literature was reviewed to determine whether there was an existing method that had been previously used to measure nursing activity. The first criteria used to accept or reject a method was that it could not add an additional requirement to the nursing staff. Therefore it had to either use data derived from measurement that was all ready ongoing. Otherwise, the data would have to be collected by an observer or observers from outside the department.

Jost (1986, 29) cautioned that people do not always have an accurate perception of their work habits or the amount of time they have spent performing various activities. He recommended using a method that was not completely dependent upon self assessment, therefore, data collected by an outside observer was preferable to data currently being collected.

Reider and Kay's study (1985, 87) added the information that nursing time could be categorized into direct and indirect care. Hagerty, Chang, and Spengler further refined this classification into direct, indirect, and non-patient care activities (1985, 11). Operational definitions for these terms as they have been used in this study are located at Appendix A.

Several systems were analyzed to determine if they could be used to distinguish between direct and indirect care.

Hagerty, Change, and Spengler (1985, 9-14) presented a system based on acuity. While they emphasized the need for

classifying patients based upon their acuity and therefore, the amount of resources needed to care for them, there was no method for determining the actual number of care hours that had been expended. While this system did not provide a tool that can be used in this study, it did establish the requirement of controlling for patient acuity when measuring direct and indirect care.

Due to the legislative requirement for Department of Defense hospitals to implement a system which will group patients into diagnosis related groups (DRGs), a study that evaluated their use as a method for determining the amount of nursing time expended was reviewed. Kreitzer et al found that "many DRGs contain patients with heterogeneous patterns of resource consumption, including nursing care" (1984, 527). Green, et al (unpublished, 3) used the Workload Management System for Nursing (WMSN) "to construct a nursing intensity based severity instrument" to ameliorate the DRG heterogeneity problem. This system is currently in various stages of implementation at all Army medical treatment facilities. It therefore met the requirement not to add to the workload of the nursing staff. The validity and reliability of the tool have also been attested to (Giovanetti 1982, 3-4). Since it was also a measure of acuity, it showed promise.

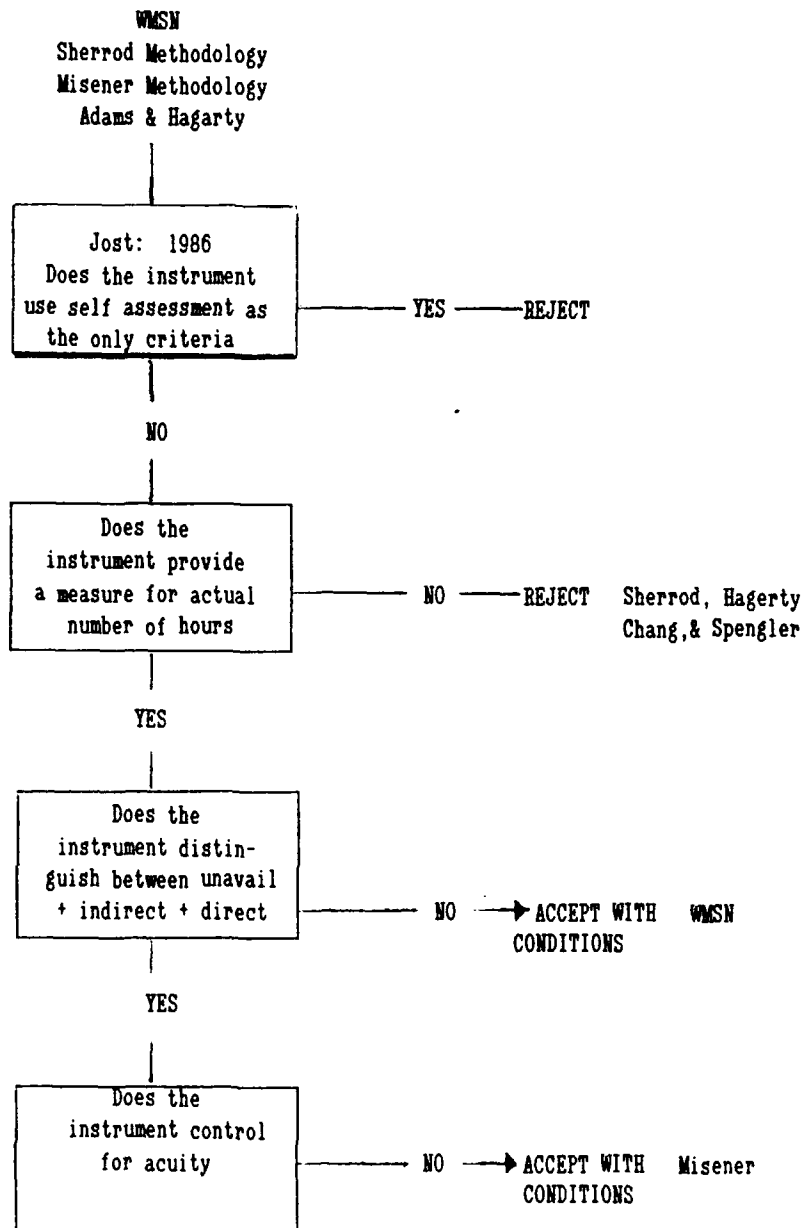
The WMSN was analyzed and was found to assign point values for each nursing activity performed. The value reflects the time

necessary to perform each direct care activity. Each point represents 7.5 minutes of direct nursing care time. Each day the sum of points is calculated and the patient is classified into one of six acuity categories. Since the documentation stated that indirect care time was included in the measurement, it was essential to determine how the value for indirect time was derived. A set of data prepared by Brooke Army Medical Center using the WMSN was obtained and reviewed. The data accounts for the number of activities performed multiplied by their weighted value. This is multiplied by 7.5 minutes to determine direct care time, as assigned by this system. This tool does not assess the actual ratio of direct to indirect hours. There is also no measure for determining the actual amount of indirect time. Indirect time is dependent to the independent value, direct time, which makes this tool inappropriate as the only measure to be used for this study. However, it can be used to control for differences in acuity.

The Sherrod et al study was reviewed to determine how the indirect component of total time had been established so that the established methodology and collection instrument could be used. However, it was determined that indirect care time was derivative by design and was included in direct care time (1981, 3). However, Misener et al conducted a study to complete the areas not covered by Sherrod et al.

The Misener study considered activities in the two other categories: indirect patient care and unavailable for patient care (1983, 2), which when added to direct patient care equal the total amount of nursing care time available. This model provides a data collection instrument that was pre-tested for validity, operational definitions for all categories of activities, and a training package to be used by raters. Across the nine sites that were used in the study, 107,700 data points (ten minute segments) were monitored using a random work sampling method (6). Indirect care comprised 60.6 percent of nursing time, 24.5 percent of time was spent providing direct care; and 15 percent was time unavailable for care. Figure 1 summarizes the decision process developed as a result of the literature review in this section.

Figure 1: Criteria for Measurement



Analysis: Four methods shown as input were analyzed by traversing the decision tree. No one model could meet the third and fourth decision points. Therefore the WMSN was selected to control for acuity and Misener et al was selected to differentiate between each category of indirect care and distinguish between (unavailable for care and indirect care) and (direct care).

Nursing Productivity

The Misener study ends with a challenge. The author states that what is reported is what was measured, not what is optimum. From this challenge it would seem that there should be a more productive way of doing business. The studies that have been reviewed to this point have attempted to match the resources to the requirement. For this purpose they have been rigorous and well-suited. However the next step is to take the data that is a produced as a result of a study and utilize it to determine what is optimum and what can be changed to increase the productivity. Productivity is defined in this case as the nurse to patient ratio as controlled by acuity. An increase in productivity would be shown by a decrease in the ratio.

Usually if productivity is the topic of discussion, it is a management effort to accomplish the same amount of work with less staff or accomplish more work with the same number of staff, state Williamson and Johnston in an article on improving nursing productivity (1988, 49). Callaway and Major (1988, 21) explain this as the requirement for the health care manager to attempt to make any savings that are possible to compensate for constant cost increases and reimbursement decreases. They affirm that managers of intensive care units have responded to this by developing scoring systems that attempt to quantify nursing workload.

The work to be done on a nursing unit is a function of the number of patients, the intensity of treatment and the acuity of the patients, states Manthey in an article (1988, 23) that explores the demands on a staff nurses time. If there is more work than hours to do that work, there is a dilemma. How does the staff nurse decide what will not be done?

"Documentation protocols should be established to reflect this decision-making and quality assurance scores should reflect this reality" states Manthey (1988, 24). Davis (1987, 164) provides the idea that all courses of treatment should have a flowchart showing the critical path. When the completion of a procedure delays the course of treatment, this should be recorded as a utilization review finding.

A realistic patient workload system for nurses must be developed over time assets Nauert et al (1989, 25). The system in use at their hospital has 37 weighted indicators of nursing need. This system, like the Nursing Workload Management System, also totals individual patient weights then places the patient into a category. The categories are also defined by the required number of nursing care hours. A standard number of hours that has been developed based on the hospital's experience, a consultant, and other hospitals using the Medicus Type 5 Patient Classification System, are multiplied by the number of patients in each category. This number is divided by the number of staff planned for that shift. The quotient becomes the individual

nurse workload index. This index is multiplied by the percent of care per shift. The planned distribution of staff at this hospital for an intensive care unit is: days 33%, evenings 35%, and nights 32% (29). The manager making the staffing decisions has the responsibility of scheduling staff based upon the individual nurse workload units required and the staffing percentage by shift. Compliance with the system is monitored to ensure that the individual workload index is within the acceptable range.

Davis (1987,164) found the amount of indirect support that is optimum can be determined by determining the ranges of highest and lowest ratios achieved for each category of indirect time. The benchmark is set at the mean or just above according to the distribution of the data. Davis also says that a review should be made annually to determine if the standard ratios require revision. This idea is expanded by Adams and Duchene. The system developed by nursing administrators at Riverside Medical Center is reevaluated every six months. Each category of indirect care time is reviewed by evaluating how much time was spent in that category. Direct patient care is analyzed by reviewing the procedural time, standards dictionaries, noting new procedures, frequencies of tasks and numbers of personnel to perform those tasks. This is accomplished to insure that changes in nursing practice are reflected in the measurement instrument to maintain content validity (1985, 15).

Benefits Realization

To determine what methods had been utilized in an effort to decrease indirect care time, studies that reported the after effects of the adoption of an acuity system were reviewed. A study by Fracassi (1987, 66) sought to answer the question, "Can productivity, efficiency and quality of patient care be improved and money saved too?" She refers to a study by Deane, et al (1986, 174-8) that found that "registered nurses spend an average of 73 minutes per 8-hour shift on documentation...interestingly the nurses' time spent in documentation was inversely related to the number of assigned patients. Fracassi states that methods that eliminate costly duplication and repetition in nurse charting while increasing the quality of the charting must be developed. She reports the results of a project undertaken by the hospital where she works to replace the current forms used for documentation. An Ad Hoc committee was formed that reviewed documentation procedures from other hospitals and developed a prototype that was tested and revised. After implementation the change in the cost of overtime when controlled for staffing levels and patient acuity was calculated and found to be substantial. She found that "Altering the documentation process may be an important step in improving productivity, efficiency and quality of patient care-while saving money for the institution." (67).

One of the notable aspects of the acuity care plan system described by Adams and Duchene (1985, 16) is that as part of the project the medical and nursing documentation of the patient's chart has been integrated. They have eliminated the duplication of paperwork. They describe this as a change to a "holistic approach to patient care" because nurses and physicians are both working from the same documentation. They have also found an increase in the accuracy of the patient record. This is not the only benefit to be obtained from integration of the approach to patient care. Knaus, as referenced by Antubas (1988, 648) reported that "The best outcomes for patients were achieved when there was a combined effort by physicians and nurses." The results also suggested that "reduction in mortality was not limited to the severity of illness or diagnosis. The overall outcome of the patient was influenced largely by unit staff interaction and coordination." Although this may seem to be an obvious finding, current documentation practices at all hospitals do not support this. The practice of having the physician and nurse complete separate patient history forms, independent of one another is one example.

The approach taken by Methodist hospital (Hillestad and Bower, 1989) is to seek automated support for the development of nursing care plans. At this hospital there is an acuity system in place, but nursing administration readily admits that staffing decisions are not usually made based upon the results. They have

little confidence in the ability of the system to match workload to staffing requirements. The nurse administrator has established criteria for selection of a new system. The system must produce a nursing care plan and as a byproduct compute how many staff are needed to support this plan. Additionally the system must be compatible with the current hardware and software. This approach demonstrates that the requirement to input the patient's needs and only receive back the number of staff needed to support that requirement is not perceived as enough of a benefit to induce the staff to do the data entry. The other conclusion that can be drawn is that there is not enough of a perceived benefit to be gained by this staffing information to warrant the cost of purchasing, installing, and maintaining separate hardware and software.

Wiley and Campbell (1986, 7-18) suggest an organizational assessment process that elicits employee participation in determining what procedural changes are needed. This process begins with a review of the current flow of patient information within the unit and between the unit and the rest of the hospital should be documented. A copy of each of the forms and written reports currently in use should be reviewed to determine which of the forms can be replaced. Every log that is in use should be identified and the information contained in that log should be analyzed to determine why it is maintained.

A series of meetings should be held with the staff. If there is a computer system that is going to be installed, these meetings should review the capabilities of the system (Gibson 1986, 203) and the set of benefits that will automatically be derived from the system's installation. The potential benefits of the system, those that will not automatically occur, should also be discussed. The results of the workflow analysis, forms, and log analysis should be identified so that duplication can be avoided.

One of the first areas which must be resolved during these meetings is the delineation of the new responsibilities that have been brought about because of changes. If these changes have been brought about to support the implementation of a computer system, the data entry of physician's notes is an example of one of these requirements (Essin et al 1985, 2172).

During this phase of the Benefits Realization Program, the standard operating procedures should be reviewed to identify functions that are repetitious and no longer needed (Glazer, et al. 1986, 53). A plan should be developed, primarily by the staff that includes analysis in several areas: (1) opportunities that exist in the department to correct problems or enhance operations, (2) which of these benefits are high priority and should be addressed, (3) what steps should be taken to pursue these benefits, (4) what factors may inhibit achieving these benefits, (5) risks from pursuing or not pursuing these benefits,

(6) who will be responsible for implementing various parts of the plan, (7) timeframes for these changes (Glazer, et al. 1986, 55).

Regardless of whether a computer system is involved in the benefits realization program, one element of the program should be a focused study to analyze how the staff currently spends their time. Williamson and Johnston (1988, 52) assert that the data should be summarized and compared by skill level, by shift, by unit, and by timeframe. Their study based on more than 100,000 individuals observations in two hospitals over seven years also persuaded them that "the important priority of enhancing nursing productivity should be directed first toward reducing indirect labor requirements." They found that the collection of work sampling data was essential in "understanding, evaluating, and improving nursing productivity." They recommend that once the data was collected a list of questions be generated from the findings that seem "out of line". From these questions a plan could be developed to further examine those components. The example given is the amount of time spent in phone duties. A focused study to collect details on the purpose, time, frequencies and the reason that the call had to be made could be completed. These focused studies could lead to conclusions that result in changes that reduce the time spent in this activity.

PERMISSION FOR DATA COLLECTION

Permission to collect data on two nursing units was obtained from the Department of Nursing. A limitation was placed on the

selection of the units to medical intensive care units, rather than surgical intensive care units.

The supervisor of the intensive care units was contacted. He arranged a meeting with the two headnurses from each unit. The project was explained to the headnurses who introduced the researcher to their staffs.

RESEARCH METHODOLOGY

Data Collection

The data was collected using the work sampling method, used by Misener et al (1983, 5) that he attributed to a technique reported by Abdellah and Levine (1954). Data was collected at predetermined intervals, and extrapolated over the interval. For this study, as with the Misener study, the interval was ten minutes. The time spent in each activity category was recorded at each ten minute intervals. The eleven activity categories are:

- 1: Direct Patient Care
- 0: Unavailable/Personal Activities
- 1: Off unit activities
- 2: Communicative Acts
- 3: Preparation of Medications, Supplies, and Equipment
- 4: Charting, Chart Reference, and Clerical
- 5: Conferences
- 6: Travel and Transportation Tasks
- 7: Administrative Tasks
- 8: Environmental Control Tasks
- 9: Wait Time

Activities zero and one were added together to obtain unavailable for care time. Activities two through nine were added together to obtain indirect care time. Operational definitions for each of indirect categories are at Appendix A,

Operational Definitions. Rater Instructions for completing the work sampling are at Appendix D. An example of the form, adapted from Misener et al (1983, Appendix 11A) is also included. If there was to be more than one rater collecting data, raters would undergo rater training. The training program, adapted from Misener et al (1983, Appendix 14) is included at Appendix E, Rater Training. The rater training would be used as a method for increasing the interrater reliability. One form was used per nursing unit, per hour during the data collection period. All three shifts were sampled.

For each shift that was sampled, a record of the number of patients at each acuity level, as defined in the Workload Management System was collected. If there was a patient admitted, discharged, or transferred, that patient was counted as being present for that shift.

The second part of the data collection effort was a review of all of the systems currently in use collecting patient data at 12.7% Brooke Army Medical Center.

Data Analysis

After the data collection was complete, two databases were constructed. The first contained one record per provider per observation period and was used for comparison with the Misener study and for the unit to unit comparison. The second contained one record per observation period and was used to compare the current staffing to the staffing recommended by the Workload

Management System for Nursing.

Comparison to Non-Military Facilities

Four hospitals were visited: Southwest Methodist (large, not-for-profit), Humana (large, for-profit), Veterans Administration (large, government, teaching), and McKenna (small, not-for-profit, community). At each hospital nursing administration provided staffing information for intensive care units and information concerning the use of an acuity based system to support staffing decisions. The patient information systems that were in use were reviewed and discussed. Since the two categories of indirect care that had shown the most increase and consumed the most indirect care time were clerical and preparation of supplies and equipment, the methods used at these hospitals to support these two functions were reviewed.

CHAPTER 2: DISCUSSION

DATA COLLECTION

During the month of November 1988 data was gathered on a unit that was not one of the two units selected for the study. This was done to attempt to avoid the learning curve and to increase rater reliability.

During the months of December 1988, January 1989, and April 1989 data was collected on two intensive care units. Data was collected during the hours shown at the inset. Care was taken to insure that data was collected on all shifts and on weekdays and weekends. To guard against weighing the data toward a particular mix of staff or patients,

	07	08	09	10	11	12	13	14
UNIT1	X		X	X		X	X	
UNIT2		X	X			X	X	X

	15	16	17	18	19	20	21	22
UNIT1	X	X		X	X		X	X
UNIT2	X					X	XX	X

	23	24	01	02	03	04	05	06
UNIT1	XX	X	X					X
UNIT2	XX	X	X	X				X

Table 1

collection was never done for more than two hours on either of the units in any one shift. To further protect the data from the learning curve of the researcher, data collection was done on one unit for two hours and then done on the other unit rather than collecting all the data from one unit and moving onto the next. Interrater reliability was not an issue because data was gathered only by the author. During each data collection shift the pattern of moving through the unit was varied. Additionally, the researcher moved out of the way of the

staff to avoid influencing their normal patterns and to discourage extended conversation. At the start of each observation period, the schedule was reviewed and the name and title of each of the nursing staff scheduled for that shift was written on the data collection sheet. The head nurse, charge nurse or wardmaster for that shift was contacted, if available, and the assignments of patients to nurses were reviewed. During data collection, each nurse was asked to furnish the acuity level of their patient. This served as a double check that the correct nurse-patient relationship had been annotated and allowed the nurse the opportunity to determine if they wanted to recompute the acuity worksheet, although this never occurred. If there was a patient for which the acuity had not yet been computed, the staff calculated the acuity prior to the end of the observation period. The acuity utilized was the last acuity calculated in the records.

STATISTICAL FINDINGS FOR CATEGORIES OF CARE

Direct, Indirect, and Unavailable For Care

From the resulting database, descriptive statistics were computed. There were 2046 potential observations which equated to 341 nursing hours. During these observations there were 147 observation points deducted because the staff member did not work through the

Category	Number	Percent
Direct	449	23.6%
Indirect	1206	63.7%
Unavail	244	12.7%
Total	1899	100.0%

Table 2

total observation period. This occurred when the observation period was close to or during a shift change and there were staff members from both shifts present. The number of actual observations was 1899. The amount of direct care time for the complete sample is 23.6% or 449 of the 1899 observations. The amount of indirect care time is 63.7% or 1206 of the 1899 observations. The amount of time unavailable for care was 12.7% or 244 of the total observations.

These percentages are compared to the findings of the Misener, et al study (1983).

In comparing the findings of this study to the results of the Misener study, for the nine hospitals and six services that were included, there

	Misener, All Sites (1)	Misener BAMC (2)	Misener BAMC CC (2)	BAMC CC
Direct	24.5	29.3	35.4	23.6
Indirect	60.5	58.9	51.5	63.7
Unavailable	15	11.8	13.1	12.7

1. Misener, Table 7, Page 26
2. Misener, Table 16, Page 17-M

Table 3

appear to be similar percentages attributable to each of the three categories. However, if the results for just Brooke Army Medical Center in the Misener study are compared, there is a slight decrease from 29.3% to 23.6% shown in the direct care percentage since 1983 when the data was collected. There is an increase in the amount of time that was unavailable for care from 11.8% to 12.7%. There is also an increase in the amount of

indirect care time from 58.9% to 63.7%.

If the Misener data is further examined and only that portion attributable to critical care at BAMC is utilized there is even a further departure between the percentage of direct care in 1983. Percentage of direct care for the Misener study was 35.4% compared to 23.6% six

	Percent Change
Direct	-11.8%
Indirect	+12.2%
Unavail	-.4%

Table 4

years later; a decrease of 11.8%. Indirect care had risen from 51.5% during the Misener study by 12.2% to 63.7%. Time unavailable for care had decreased by .04% from 13.1 to 12.7.

Table 5 shows the results of the test to determine if the difference between the percentages of each category from that portion of the Misener data attributable to BAMC and the current data are significant. The CHI-Square value of 3.658 with 2 degrees of freedom is not significant at the .05 level, therefore the null hypothesis cannot be rejected.

COMPARISON DIR, IND, UNAVAIL			
OBSERVED VALUES (Cell format: count/ percent: total/ percent:row/ percent:col)			
MISENER (BAMC CC 1)	CURRENT (BAMC CC)	TOTAL	
DIRECT	35	24	59
1)	17.70	11.80	29.50
(60.00	40.00	
)	35.40	23.60	
INDIRECT	52	64	115
2)	25.75	31.85	57.60
(44.70	55.30	
)	51.50	63.70	
UNAVAIL	13	13	26
3)	6.55	6.35	12.90
(50.78	49.22	
)	13.10	12.70	
TOTAL	100	100	200
(50.00	50.00	100.00
CHI-SQUARE = 3.658, D.F. = 2, PROB. = .1606			
(1) Misener, Table 15, Page 17-L			

Table 5

Indirect Care

Table 6 shows the categories of indirect care, the number of observations and the percent of indirect care time spent in each. It is especially interesting to note that the amount of clerical time is almost a magnitude higher than any of the other categories of indirect care time.

In ranking the percentages of total time and percentages of indirect care time: 20.6% of the total time which was 32.5% of indirect care time was spent performing clerical functions, primarily charting; 11% of the total time which was 17.3% of indirect care time was spent preparing supplies or equipment for use; 8.8% of the total time or 13.8% of indirect care time was spent

in communicative activities. Waiting or slack time accounted for 7.9% of the total time or 12.4% of the indirect care time. This is time that the nurse was available to provide care, but was not doing any of the other activities. Conferences accounted for 7.5% of total time or 11.8% of indirect care time. Much of this time was spent at shift change in the formal conference that occurs between the departing head nurse or charge nurse and the oncoming shift. Administrative time accounted for 2.9% of total time or 4.5% of indirect care time and was utilized primarily by headnurses, wardmasters, charge nurses and wardclerks. Travel time, that time required to move from one place to another accounted for 2.7% of the total sample or 4.1% of indirect care time. This included within the nursing unit and to other parts of the hospital. It was surprising that this percentage was so

	Number of Observ ations	Percent of Total	Percent of Indir
Clerical	392	20.6	32.5
Preparation	209	11.0	17.3
Communicative	167	8.8	13.8
Wait/Slack	149	7.9	12.4
Conferences	142	7.5	11.8
Administrative	54	2.9	4.5
Travel Time	50	2.7	4.1
Environment	43	2.3	3.6
INDIRECT CARE	1206	63.7	100.0

Table 6

low when compared to other categories because of the attention given to this category as one of the significant contributors to overhead and the numerous initiatives to reduce the time spent transporting patients from one location to another.

Environmental time accounted for the final 2.3% of total time and 3.44% of indirect time.

Table 7 shows data from the Misener study for all sites and services in Column 1, the Misener study for BAMC in Column 2, the Misener study using only the BAMC critical care data in Column 3, and the current study in Column 4. The categories that show the most change are clerical, which in the baseline study

	Misener Total Sample (1)	Misener Total BAMC (2)	Misener BAMC CC (2)	BAMC CC
DIRECT	24.5%	29.3%	35.4%	23.6%
INDIRECT	60.5%	58.9%	51.5%	63.7%
Clerical	11.0%	9.1%	8.8%	20.6%
Preparation	5.0%	5.6%	6.5%	11.0%
Communicative	9.8%	9.8%	10.3%	8.8%
Wait/Slack	8.7%	8.7%	5.1%	7.9%
Conferences	3.9%	4.3%	4.5%	7.5%
Administrative	9.3%	11.4%	7.5%	2.9%
Travel Time	10.7%	8.1%	7.3%	2.7%
Environment	1.9%	1.8%	1.6%	2.3%
UNAVAILABLE	15.0%	11.8%	13.1%	12.7%
TOTAL	100.0%	100.0%	100.0%	100.0%

Table 7

accounted for only 11% of the total time, 9.1% at BAMC, 8.8% for BAMC critical care, and 20.6% in the current study. Preparation of supplies also showed an increase. The Misener study established a baseline of 5%, with BAMC utilizing a slightly higher percentage at 5.6%. BAMC critical care showed a slightly higher percentage at 6.4%; however the increase to 11% of the total time requires further investigation. Time required for

communication is currently 1% lower than the total Misener study and that portion of the data attributable to BAMC and 1.5% lower than for BAMC critical care. Time spent waiting, is currently .8% lower than the Misener study and for the BAMC data, but 2.8% higher than BAMC critical care in 1983. Time spent in conferences is 3.6% higher than the Misener data but only 3.2% higher than BAMC data, and 3% higher than the BAMC critical care data. The percentage of time currently devoted to administration is currently much lower, with Misener reporting 9.3% of the total dedicated to this in 1983, 11.4% dedicated to administration at BAMC, 7.5% at BAMC critical care, but only 2.9% currently used. Since this time is primarily accounted for by the presence of a headnurse or wardmaster, the percentage of time data was collected on each shift would contribute to this difference. Misener collected 64.7% during the day shift, 22.9% during the evening shift, and 12.5% during the night shift (Table 3, Page 22), versus 44.9% during the day, 30.3% during the evening, and 24.8% during the night shift.

To compare the temporal categories of indirect care from the current study to the Misener study, it is necessary to look at indirect care independently, as shown in Table 8. The data from the Misener study are shown in the first column. Clerical time was 18.3% compared to 15.4% found at BAMC for all wards and units. When this is compared to the 32.5% currently utilized, there is a difference that requires further investigation. The

next category of indirect care time, preparation of supplies and equipment accounted for 8.2% of indirect care time for the total sample during the Misener study.

When only the portion attributable to BAMC is reviewed there is a 1.3% increase from the baseline study to 9.5%. When the data from the Misener study pertaining only to critical care at BAMC is reviewed the trend

again moves to a higher

percentage (12.4%) of indirect care time; however, it is still 4.9% lower than the current percentage of 17.3%. Time required for communication for the Misener study was 16.2% and showed only a slight increase to 16.6% when the BAMC data were reviewed independently. An increase to 20.1% was found when the BAMC data for critical care were separated. The current study shows a reduction to 13.8%. Time spent waiting accounted for 14.4% of the indirect care time in the Misener study, 15% of the indirect care time for the Misener data from BAMC, with a drop to only 9.9% of indirect care time accounted for in the critical care units. This has increased by 2.5% to 12.4% of indirect care time. Conferences explained 6.5% of indirect care time in the

	Misener Total Sample (1)	Misener Total BAMC (2)	Misener BAMC CC (3)	BAMC CC
Clerical	18.3%	15.4%	17.0%	32.5%
Preparation	8.2%	9.5%	12.4%	17.3%
Communicative	16.2%	16.6%	20.1%	13.8%
Wait/Slack	14.4%	15.0%	9.9%	12.4%
Conferences	6.5%	7.3%	8.7%	11.8%
Administrative	15.4%	19.5%	14.6%	4.5%
Travel Time	17.8%	13.7%	14.1%	4.1%
Environment	3.2%	3.0%	3.1%	3.6%

1. Misener, Figure 3, Page 12
2. Misener, Table 21, Page 40
3. Misener, Table 23, Page 17-5

Table 8

total Misener data, 7.3% of the indirect care time at BAMC, and 8.7% of the indirect care time at the BAMC critical care units surveyed. This has risen by 3.1% to 11.8% of the indirect care time. In the total sample for the Misener study, 15.4% of the indirect care time was spent performing administrative tasks. At BAMC this percentage rose to 19.5%, and on the BAMC critical care units dropped to 14.6%. The current study found that only 4.6% of indirect care time was attributable to administration. Travel time accounted for 17.8% of indirect care time for the Misener sample, 13.7% of the BAMC portion, and 14.1% of the BAMC critical care indirect care time. Only 4.1% of the current indirect care time was utilized as travel time. The last element of indirect care time, environment, accounted for 3.2% of indirect care time in the original Misener study and has varied little throughout. The current study shows 3.6% of indirect care time being utilized for environmental tasks.

When this data is tested, the CHI Square value of 18.454 with 7 degrees of freedom is significant. Therefore, the null hypothesis: percentages of time attributable to the categories of indirect care using that portion of the Misener data attributable to BAMC critical care is not significantly different than the percentage of time attributable to the categories of indirect care from the current study may be rejected. The major increase has been in clerical time and time spent preparing supplies and equipment. The major decreases have been in administrative time and travel.

COMPARISON OF INDIRECT CATEGORIES-OBSERVED			
	MISBAMCCC	CURBAMCCC	TOTAL
CLERICAL:	17%	33%	50
1:	8.50%	16.26%	24.76
	34.34%	65.66%	
	17.02%	32.50%	
PREP:	12%	17%	30
2:	6.20%	8.65%	14.86
	41.75%	58.25%	
	12.41%	17.30%	
COMMON:	20%	14%	34
3:	10.06%	6.90%	16.96
	59.29%	40.71%	
	20.12%	13.80%	
WAIT/SLAC:	10%	12%	22
4:	4.95%	6.20%	11.16
	44.39%	55.61%	
	9.91%	12.40%	
CONFEREN:	9%	12%	21
5:	4.35%	5.90%	10.26
	42.44%	57.56%	
	8.71%	11.80%	
ADMIN:	15%	5%	19
6:	7.30%	2.25%	9.55
	76.44%	23.56%	
	14.61%	4.50%	
TRAVEL:	14%	4%	18
7:	7.05%	2.05%	9.10
	77.47%	22.53%	
	14.11%	4.10%	
ENVIRON:	3%	4%	7
8:	1.55%	1.80%	3.35
	46.27%	53.73%	
	3.10%	3.60%	
TOTAL:	100%	100%	200
	49.97%	50.03%	100.00
CHI-SQUARE = 18.454, D.F. = 7, PROB. = .0101			

Table 9

Unavailable For Care

Time unavailable for care was divided into two categories -- personal time and offunit time. This includes staying with a patient while a special procedure was performed somewhere else in the hospital or going to the laboratory. Also included in this category is the time spent by the headnurse or wardmaster offunit in meetings.

TIME UNAVAILABLE FOR CARE		
	Nr. of Observations	Percent
Personal	199	82%
Offunit	45	18%
Total	244	100%

Table 10

Time unavailable for care as a percentage of total time was compared to the same two categories in the Misener study for that portion of the data attributable to BAMC critical care. While BAMC's total time unavailable for care was slightly lower (12.7% compared to 13.1%) than the Misener data the percentage attributable to personal time was higher.

PERCENT OF TOTAL		
	Misener BAMC CC (1)	Current BAMC CC
UNAVAILABLE	13.1%	12.7%
Personal	6.7%	10.4%
Offunit	6.4%	2.3%
(1) Misener, Table 15, Page 17-L		

Table 11

To determine if there was statistical significance to the difference, the components of the category time unavailable for care from the Misener data for BAMC Critical Care were compared to the current sample. The findings are shown in Table 12. The Chi-square of 19.842 is significant at the .05 level, such that the null hypothesis: The percentage of time unavailable for care in the Misener study for BAMC critical care data is not significantly different than the percentage of time unavailable for care in the current study may be rejected.

TIME UNAVAILABLE FOR CARE			
OBSERVED VALUES (Cell format: count/ percent; total/percent; row/ percent; col)			
	MISENER CRIT CARE	BAMC CRIT CARE	TOTAL
PERSONAL TIME	51 25.65 38.48 51.30	82 41.00 61.52 82.00	133 66.65
OFFUNIT TIME	49 24.35 73.01 48.70	18 9.00 26.99 18.00	67 33.35
TOTAL	100 50.00	100 50.00	200 100.00
CHI-SQUARE WITH CONTINUITY CORRECTION FACTOR=19.842, PROB.= 8.41E-06			
CHI-SQUARE WITHOUT CONTINUITY CORRECTION FACTOR=21.201, PROB.= 4.136E-06			
D.F. = 1			

Table 12

Slack Time

There are two subcategories of time that are potentially available for use. WAIT time, within the indirect category, and PERSONAL time, within the unavailable for care category. Both represent an opportunity cost. Of the 1899 observations, 149 or 7.9% were spent in the WAIT category and 199

or 10.5% were spent on personal time, for a total of 348 or 18.4% of the sample. In the slack time category, 42.8% was wait time and 57.2% was personal time.

The data from the Misener study showed that for the total sample 8.7% was wait time and 8.8% was personal time for a total slack of 17.5%. The Misener data attributable to BAMC showed 7.0% was wait time and 8.7% was personal time for a total slack of 15.7%. The

Misener data attributable to BAMC critical showed 5.1% waiting and 6.7% personal for a total of 11.8% slack time. The current study shows 7.9% wait time and 10.5% personal time for a total

SLACK TIME			
	Nr. of of Observations	Percent of Total	Percent of Slack
Wait	149	7.9%	42.8%
Personal	199	10.5%	57.2%
Total	348	18.4%	100.0%

Table 13

SLACK TIME				
	Misener (1)	Misener BAMC (2)	Misener BAMC CC (2)	Current BAMC CC
Wait	8.7%	8.7%	5.1%	7.9%
Personal	8.8%	7.0%	6.7%	10.5%
TOTAL	17.5%	15.7%	11.8%	18.4%

(1) Misener, Table 12, Page 31

(2) Misener, Table 15, Page 17-L

Table 14

slack of 18.4%.

When the data from the Misener study attributable to critical care at BAMC is compared to the current study it is shown that WAIT time increased by 3% and PERSONAL time increased by 4%. Overall this is an increase from 12% to 19% in the SLACK category. When this data is compared for statistical significance, a CHI-Square value of 1.699 with 2 degrees of freedom is not significant. Therefore the null hypothesis: percentage of slack time for the Misener study for BAMC critical data is not significantly different than the percentage of slack time for the current study cannot be rejected.

SLACK TIME			
OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)			
	MISENER: BAMC CC	CURRENT: BAMC CC	TOTAL
WAIT	5	8	13
TIME	2.55	3.95	6.50
	39.23	60.77	
	5.10	7.90	
PERSONAL	7	11	17
TIME	3.35	5.25	8.60
	38.95	61.05	
	6.70	10.50	
NOT SLACK	88	82	170
TIME	44.10	40.80	84.90
	51.94	48.06	
	88.20	81.60	
TOTAL	100	100	200
	50.00	50.00	100.00
CHI-SQUARE = 1.699, D.F. = 2, PROB. = .4276			
Misener, Table 15, Page 17-L			

Table 15

STATISTICAL FINDINGS FOR EACH PROVIDER CATEGORY

The percentage of the data accounted for by each category of provider is shown at Table 16. Headnurses accounted for 3.1% of the data collected with 59 of the 1899 observations. Wardmasters accounted for 3.4% of the data collected with 64 of the 1899 observations. Wardclerks accounted for 106 of the 1899 observations or 5.6%. Military registered nurses accounted for 308 of the 1899 observations or 16.2%. Civilian registered nurses accounted for 284 of the 1899 observations or 15%.

PERCENT OF TOTAL DATA BY CATEGORY OF PROVIDER		
	Nr. of Observ	Percent
Headnurse	59	3.1%
Wardmaster	64	3.4%
Wardclerk	106	5.6%
Military RN	308	16.2%
Civilian RN	284	15.0%
Agency RN	321	16.4%
RN Student	87	4.6%
Civilian LPN	259	13.6%
91C	280	14.7%
91C Students	76	4.0%
Reservist	36	1.9%
Volunteer	19	1.0%
TOTAL	1899	100.0%

Table 16

Agency nurses accounted for 321 of the 1899 observations or 16.4%. Registered nurses who were students in the intensive care course accounted for 87 of 1899 observations or 4.6%. Civilian licensed practical nurses accounted for 259 of the 1899 observations or 13.6%. Practical nurse specialists (91Cs) accounted for 280 of the observations or 14.7%. Students from the practical nurse specialist course accounted for 76 of the 1899 observations or 4%. Reservists accounted for 36 of the 1899 observations or 1.9%. Volunteers accounted for 19 observations or 1%.

The percentage of time each group spent in each of the categories is shown at Table 17. Since slack time is composed of

one variable from the indirect category and one from the unavailable category, it is outside of 100%. Student registered nurses had the highest percentage of direct care time and the lowest percentage of time that was

	HNRS	WMAS	WCLK	MRN	CRN	AGNY	SRN	91C	LPN	S91	RES	VOL
DIR	5%	6%	0%	28%	30%	29%	31%	24%	23%	22%	22%	0%
IND	66%	81%	72%	63%	61%	60%	67%	66%	61%	57%	53%	100%
UNV	29%	13%	28%	9%	9%	11%	2%	10%	16%	21%	25%	0%
SLK	3%	19%	12%	16%	12%	17%	21%	19%	20%	43%	36%	0%

DIR=Direct, IND=Indirect, UNV=Unavailable, SLK=Slack,
 HNRS=Headnurse, WMAS=Wardmaster, WCLK=Wardclerk, MRN=Military
 Registered Nurse, CRN=Civilian Registered Nurse, AGNY=Agency
 Nurse, SRN=Military Registered Nurse Student from the Critical
 Care Course, 91C=Military Practical Nurse Specialist 91C,
 LPN=Civilian Licensed Practical Nurse, S91=Student from the 91C
 Course, RES=Reservist, VOL=Volunteer

Table 17

unavailable for care. This may be attributable to students not being an established member of the unit and therefore not assigned overhead responsibilities, although this same argument could be made for the Agency nurses. Another possible explanation of the high percent of direct care time and low percent of time unavailable could be that, as students it takes longer to perform the same tasks and leaves less time for personal time. The lowest percentage of direct care time for those with direct patient care responsibilities are licensed practical nurses.

Headnurses

Headnurses in the current study spent 5.1% of their time in direct care. Of the 66.1% spent in indirect care, 5.1% was clerical, 13.6% was time spent preparing supplies and equipment, 15.3% of the time was spent in communicative activities, 1.7% waiting, 11.9% in conferences, 16.8 performing administrative tasks, and 1.7% in travel. Of the 28.8% spent in the unavailable for care category, 1.7% was personal time and 27.1% off the unit.

HEADNURSES	
DIRECT	5.1%
INDIRECT	66.1%
Clerical	5.1%
Prep	13.6%
Commun	15.3%
Wait	1.7%
Confer	11.9%
Admin	16.8%
Travel	1.7%
Envir	0%
UNAVAILABLE	28.8%
Personal	1.7%
Offunit	27.1%

Table 18

Headnurses in the Misener study spent 15% of their time in direct care, 68% in indirect care, and 17% of their time in the unavailable for care category. In that portion of the study attributable to headnurses at BAMC, 26% was in direct care, 62% in indirect care and 11% unavailable for care. The current study showed that 5% of headnurses time was spent in direct care, 66% in indirect care and 29% unavailable for care. As shown in Table 19 there is a significant difference

between the samples with a

Chi-Square value of 23.729, with 4 degrees of freedom. This allows rejection of the null hypothesis: There is no significant difference in the percentage of direct care, indirect care, and unavailable for care time for headnurses between the Misener study data, the Misener BAMC data, and the current study.

HEADNURSES: COMPARISON BETWEEN MISENER, MISENER BAMC, AND CURRENT				
OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)				
	MISENER (1)	MISENER BAMC(2)	CURRENT BAMC CC	TOTAL
DIRECT	15 4.83 31.59 14.50	26 8.77 57.30 28.30	5 1.70 11.11 5.10	46 15.30
INDIRECT	68 22.80 34.76 68.40	62 20.77 31.66 62.30	66 22.03 33.59 66.10	197 65.60
UNAVAIL	17 5.70 29.84 17.10	11 3.80 19.90 11.40	29 9.60 50.26 28.80	57 19.10
TOTAL	100 33.33	100 33.33	100 33.33	300 100.00
CHI-SQUARE = 23.279, D.F. = 4, PROB. = 1.113E-04				
(1) Misener, Table 13, Page 32				
(2) Misener, Table 12, Page 17-1				

Table 19

Analysis of the indirect care category discloses that headnurses spend 26% of their indirect time in administrative activities, 23% in communicative activities, 21% preparing supplies and equipment, 18% in conferences, 8% in clerical activities, and 3% in both travel and time spent waiting.

These percentages are compared to the percentages for indirect care for the Misener data and the Misener data for BAMC as shown in the CHI Square analysis Table 20. The null hypothesis: percentage of the temporal categories of indirect care time for headnurses in the current study is not significantly

	MIS (1)	MIS-B(2)	CURRENT	TOTAL
COMMUN	26	27	23	76
	8.66	9.00	7.70	25.36
	34.17	35.48	30.35	
	25.97	27.00	23.10	
PREP	5	5	21	30
	1.57	1.67	6.83	10.06
	15.56	16.56	67.88	
	4.70	5.00	20.50	
CLER	15	19	8	42
	5.19	6.20	2.57	13.86
	36.78	44.71	18.51	
	15.28	18.60	7.70	
CONF	10	17	18	45
	3.47	5.56	5.96	15.00
	23.11	37.11	39.78	
	10.39	16.70	17.80	
TRAV	9	4	3	16
	2.90	1.40	.87	5.16
	56.13	27.10	16.77	
	8.69	4.20	2.60	
ADMIN	32	27	26	84
	10.60	8.90	8.53	28.02
	37.81	31.75	30.44	
	31.77	26.70	25.60	
ENVIR	1	0	0	1
	.17	.10	.00	.27
	62.50	37.50	.00	
	.50	.30	.00	
WAIT	3	2	3	7
	.90	.50	.87	2.27
	39.71	22.06	38.24	
	2.70	1.50	2.60	
TOTAL	100	100	100	300
	33.36	33.32	33.32	100.00
CHI-SQUARE = 28.739, D.F. = 14, PROB. = .0113				
(1) Misener, Table 22, Page 41 (2) Table 22, Page 17-R				

Table 20

different than the percentage of the temporal categories of indirect care time for headnurses in the Misener study or in that portion of the Misener data attributable to BAMC can be rejected. The most significant difference is the increase in preparation of supplies and equipment from 5% to 21%.

The unavailable for care category was responsible for 11% of the headnurses' time in the Misener study for data attributable to BAMC; 6 % personal and 5% offunit. This category accounted for 29% of the headnurses' time in the current study; 2% personal and 27% offunit. The CHI-Square value of 19.837, with 2 degrees of freedom allows the hypothesis: percentage of time unavailable for care in the Misener study for the data attributable to BAMC is not significantly different than the percentage of time unavailable for care in the current study to be rejected.

HEADNURSES: UNAVAILABLE FOR CARE			
OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)			
	MISENER: BAMC	CURRENT: BAMC CC	TOTAL
PERSONAL:	6	21	8
TIME:	3.20	.85	4.05
	79.01	20.99	
	6.40	1.70	
OFFUNIT:	5	27	32
TIME:	2.50	13.55	16.05
	15.58	84.42	
	5.00	27.10	
OTHER:	89	71	160
TIME:	44.30	35.60	79.90
	55.44	44.56	
	88.60	71.20	
TOTAL:	100	100	200
	50.00	50.00	100.00
CHI-SQUARE = 19.837, D.F. = 2, PROB. = 4.925E-05			
(1) Misener, Table 12, Page 17-1			

Table 21

The slack time category accounted for 7% of headnurses' time in the Misener study; 6% in personal time and 1% . In the current study this was reduced to 3% of the total; 2% in personal time and 2% in wait time. The difference in the total is due to rounding. The CHI-Square value of 2.993 with 2 degrees of freedom does not allow the null hypothesis: slack time for headnurses in the data attributable to BAMC in the Misener study is not significantly different than slack time for headnurses in the current study to be rejected.

HEADNURSES: SLACK TIME			
OBSERVED VALUES (Cell format: count/ percent;total/ percent;row/ percent;col)			
	MISENER BAMC(1)	CURRENT BAMC CC	TOTAL
PERSONAL	6	2	8
TIME	3.20	.85	4.05
	79.01	20.99	
	6.40	1.70	
OFFDUTY	1	2	3
TIME	.50	.85	1.35
	37.04	62.96	
	1.00	1.70	
OTHER	93	97	189
TIME	46.30	48.30	94.60
	48.94	51.06	
	92.60	96.60	
TOTAL	100	100	200
	50.00	50.00	100.00
CHI-SQUARE = 2.993, D.F. = 2,			
PROB. = .2239			
(1) Misener, Table 12, Page 17-1			

Table 22

Wardmasters

Wardmasters in the current study spent 6.2% of their time in direct care. Of the 81.3% spent in indirect care, 3.1% was clerical, 17.2% was time spent preparing supplies and equipment, 6.3% of the time was spent in communicative activities, 10.9% waiting, 4.7% in conferences, 15.6% performing administrative tasks, 9.4% in travel, and 14.1% in environmental activities. Of the 12.5% spent in the unavailable for care category, 7.8% was personal time and 4.7% was time off the unit.

WARDMASTERS	
DIRECT	6.2%
INDIRECT	81.3%
Clerical	3.1%
Prep	17.2%
Commun	6.3%
Wait	10.9%
Confer	4.7%
Admin	15.6%
Travel	9.4%
Envir	14.1%
UNAVAILABLE	12.5%
Personal	7.8%
Offunit	4.7%

Table 23

Wardmasters in the Misener study spent 8% of their time in direct care, 68% in indirect care, and 24% of their time was in the unavailable for care category. In that portion of the Misener study attributable to wardmasters at BAMC, 13% was in direct care activities, 70% in indirect care and 17% was unavailable for care. The current study showed that 6% of wardmasters time was spent in direct care, 81% in indirect care and 13% unavailable for care. As shown in the inset there is not a significant difference between the samples. The Chi-Square value of 7.912, with 4 degrees of freedom, does not allow rejection of the null hypothesis: There is no difference in the percentage of direct care, indirect care, and unavailable for care time for wardmasters between the Misener study data, the Misener BAMC data, and the current study.

WARDMASTERS: COMPARISON BETWEEN MISENER,
MISENER BAMC, AND CURRENT

OBSERVED VALUES (Cell format: count/ percent:total
/ percent:row/ percent:col)

	MISENER (1)	MISENER BAMC(2)	CURRENT BAMC CC	TOTAL
DIRECT	8 2.73 29.60 8.20	13 4.43 48.01 13.30	6 2.07 22.38 6.20	28 9.23
INDIRECT	68 22.70 31.07 68.10	70 23.27 31.84 69.80	81 27.10 37.09 81.30	219 73.07
UNAVAIL	24 7.90 44.63 23.70	17 5.63 31.83 16.90	13 4.17 23.54 12.50	53 17.70
TOTAL	100 33.33	100 33.33	100 33.33	300 100.00

CHI-SQUARE = 7.912, D.F. = 4, PROB. = .0948

(1) Misener, Table 13, Page 32

(2) Misener, Table 12, Page 17-1

Table 24

In ranking the indirect care category show that wardmasters spend 21% of their indirect care time preparing supplies and equipment, 19% performing administrative functions, 17% in environmental activities, 14% waiting, 12% in travel, 8% communicating, 6% in conferences, and 4% in clerical activities.

The percentages are compared to the percentages for indirect care for the Misener data and the Misener data for BAMC as shown in the CHI Square analysis at Table 25, resulting in a CHI Square value of 57.221 with fourteen degrees of freedom. The null hypothesis: percentage of the temporal categories of indirect care time for wardmasters in the current study is not significantly

	MIS (1)	BAMC (2)	CURRENT	TOTAL
COMMUN:	14:	8:	8:	30
	4.50:	2.77:	2.57:	9.83
	45.76:	28.14:	26.10:	
	13.49:	8.30:	7.70:	
PREP:	8:	14:	21:	43
	2.63:	4.57:	7.06:	14.26
	18.46:	32.01:	49.53:	
	7.89:	13.70:	21.20:	
CLER:	4:	1:	4:	8
	1.17:	.23:	1.27:	2.67
	43.75:	8.75:	47.50:	
	3.50:	.70:	3.80:	
CONF:	4:	5:	6:	15
	1.47:	1.70:	1.93:	5.10
	28.76:	33.33:	37.91:	
	4.40:	5.10:	5.80:	
TRAV:	17:	15:	12:	43
	5.66:	4.97:	3.83:	14.46
	39.17:	34.33:	26.50:	
	16.98:	14.90:	11.50:	
ADMIN:	47:	52:	19:	118
	15.49:	17.39:	6.40:	39.29
	39.44:	44.27:	16.28:	
	46.45:	52.20:	19.20:	
ENVIR:	2:	4:	17:	24
	.73:	1.37:	5.76:	7.86
	9.32:	17.37:	73.31:	
	2.20:	4.10:	17.30:	
WAIT:	5:	1:	14:	20
	1.70:	.33:	4.50:	6.53
	26.02:	5.10:	68.88:	
	5.09:	1.00:	13.50:	
TOTAL:	100:	100:	100:	300
	33.36:	33.32:	33.32:	100.00

CHI-SQUARE = 57.221, D.F. = 14, PROB. = 3.582E-07
 (1) Misener, Table 22, Page 41 (2) Table 22, Page 17-R

Table 25

different than the percentage of the temporal categories of indirect care time for wardmasters in the Misener study or in that portion of the Misener data attributable to BAMC is rejected.

The largest difference is the percent of indirect care time required for administration. The Misener data showed 47% of indirect care time involved with this category. When this is compared to the current 19%, it is evident a change has taken place. Another category that has significantly changed is the percentage of time spent in environmental care. The Misener data showed 2% of indirect care time in this category. The Misener data for BAMC showed an increase to 4%. The current study found that this had increased to 17%.

The unavailable for care category was responsible for 17% of the wardmasters' time in the Misener study for data attributable to BAMC; 8% personal and 9% offunit. This category accounted for 13% of the wardmasters' time in the current study; 8% personal and 5% offunit. The CHI-Square value of 1.464, with 2 degrees of freedom does not allow the hypothesis: percentage of time unavailable for care in the Misener study for the data attributable to wardmasters at BAMC is not significantly different than the percentage of time unavailable for care for wardmasters in the current study to be rejected.

WARDMASTERS: UNAVAILABLE FOR CARE

OBSERVED VALUES (Cell format: count/
percent;total/ percent:row/ percent:col)

	MISENER: CURRENT		
	BAMC	BAMC	TOTAL
PERSONAL	8	8	16
TIME	3.95	3.90	7.85
	50.32	49.68	
	7.90	7.80	
OFFUNIT	9	5	14
TIME	4.50	2.35	6.85
	65.69	34.31	
	9.00	4.70	
OTHER	83	88	171
TIME	41.55	43.75	85.30
	48.71	51.29	
	83.10	87.50	
TOTAL	100	100	200
	50.00	50.00	100.00

CHI-SQUARE = 1.464, D.F. = 2, PROB. = .4810

(1) Misener, Table 12, Page 17-1

Table 26

The slack time category accounted for 9% of wardmasters' time in the Misener study; 8% in personal time and 1% in wait time. In the current study this was 19% of the total; 8% in personal time and 11% in wait time. The CHI-Square value of 9.560 with 2 degrees of freedom allows the null hypothesis: slack time for wardmasters in the data attributable to BAMC in the Misener study is not significantly different than slack time for wardmasters in the current study to be rejected.

WARDMASTERS: SLACK TIME			
OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)			
	MISENER (BAMC(1))	CURRENT (BAMC)	TOTAL
PERSONAL TIME	8/ 3.95/ 50.32/ 7.90	8/ 3.90/ 49.68/ 7.80	16 7.85
WAIT TIME	1/ .35/ 6.03/ 7.0	1/ .45/ 93.97/ 10.90	2 5.80
OTHER TIME	91/ 45.70/ 52.92/ 91.40	81/ 40.65/ 47.08/ 81.30	173 86.35
TOTAL	100/ 50.00	100/ 50.00	200 100.00
CHI-SQUARE=9.560, D.F.= 2, PROB.=8.395E-03			
(1) Misener, Table 12, Page 17-1			

Table 26.1

Wardclerks

Wardclerks in the current study spent none of their time in direct care. Of the 71.7% spent in indirect care, 38.7% was clerical, 2.8% was time spent preparing supplies and equipment, 13.2% of the time was spent in communicative activities, 2.8% waiting, none in conferences, 8.5% performing administrative tasks, 8.5% in travel, and none in environmental activities. Of the 28.3% spent in the unavailable for care category, 18.9% was personal time and 9.4% off the unit.

WARDCLERKS	
DIRECT	0%
INDIRECT	71.7%
Clerical	38.7%
Prep	2.8%
Commun	13.2%
Wait	2.8%
Confer	0%
Admin	8.5%
Travel	8.5%
Envir	0%
UNAVAILABLE	28.3%
Personal	18.9%
Offunit	9.4%

Table 27

Wardclerks in the Misener study spent 3% of their time in direct care, 75% in indirect care, and 22% of their time was in the unavailable for care category. In that portion of the Misener study attributable to wardclerks at BAMC, 4% was in direct care activities, 74% in indirect care and 23% was unavailable for care.

The current study showed that none of the wardclerks time was spent in direct care, 72% in indirect care and 28% unavailable for

care. As shown in the inset there is not a significant difference between the samples as a Chi-Square value of 4.406, with 4 degrees of freedom. This does not allow rejection of the null hypothesis: There is no difference in the percentage of direct care, indirect care, and unavailable for care time for wardclerks between the Misener study data, the Misener BAMC data, and the current study.

WARDCLERKS: COMPARISON BETWEEN MISENER, MIS BAMC, CURRENT BAMC				
OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)				
	MISENER (1)	MISENER BAMC(2)	CURRENT BAMC CC	TOTAL
DIRECT	3	4	0	7
	1.00	1.17	.00	2.17
	46.15	53.85	.00	
	3.00	3.50	.00	
INDIRECT	75	74	72	221
	25.02	24.66	23.89	73.58
	34.01	33.51	32.47	
	75.10	73.93	71.70	
UNAVAIL	22	23	28	73
	7.30	7.53	9.43	24.26
	30.08	31.04	38.87	
	21.90	22.58	28.30	
TOTAL	100	100	100	300
	33.32	33.36	33.32	100.00
CHI-SQUARE = 4.406, D.F. = 4, PROB. = .3539				
(1) Misener, Table 13, Page 32				
(2) Misener, Table 12, Page 17-1				

Table 28

A ranking of the percentages of time wardclerks spent in indirect care activities indicates that 54% of indirect time is spent accomplishing clerical, or patient charting functions. The activity that consumes the second highest percent of indirect care time is communicative activities, 18%, followed by administrative activities, 12%, travel and transportation, 8%, and preparation of supplies and equipment, 4%, and wait time, 4%.

The percentages are compared to the percentages for indirect care for the Misener data and the Misener data for BAMC as shown in the CHI Square analysis at

	MIS (1)	BAMC(2)	CURRENT	TOTAL
COMMUN	18	15	18	51
	5.87	4.87	6.14	16.87
	34.78	28.85	36.36	
	17.62	14.60	18.40	
PREP	1	0	4	6
	.30	.13	1.33	1.77
	16.98	7.55	75.47	
	.90	.40	4.00	
CLER	34	15	54	103
	11.24	5.14	17.97	34.34
	32.72	14.95	52.33	
	33.73	15.40	53.90	
CONF	0	0	0	1
	.10	.07	.00	.17
	60.00	40.00	.00	
	.30	.20	.00	
TRAV	13	9	8	29
	4.17	2.97	2.63	9.77
	42.66	30.38	26.96	
	12.51	8.90	7.90	
ADMIN	30	57	12	98
	9.84	18.87	3.93	32.64
	30.13	67.81	12.05	
	29.53	56.60	11.80	
ENVIR	0	1	0	1
	.13	.17	.00	.30
	44.44	55.56	.00	
	.40	.50	.00	
WAIT	5	3	4	12
	1.67	1.13	1.33	4.13
	40.32	27.42	32.26	
	5.01	3.40	4.00	
TOTAL	100	100	100	300
	33.31	33.34	33.34	100.00
CHI-SQUARE = 59.831, D.F. = 14, PROB. = 1.256E-07				
(1) Misener, Table 22, Page 41 (2) Misener, Table 22, Page 17-B				

Table 29

Table 29, resulting in a CHI square value of 59.831 with fourteen degrees of freedom. The null hypothesis: percentage of the temporal categories of indirect care time for wardclerks in the current study is not significantly different than the percentage of the temporal categories of indirect care time for wardclerks in the Misener study or in that portion of the Misener data attributable to BAMC is rejected.

The categories of indirect care time that contributed most to the significance of the difference are the increase in clerical time from 34% in the Misener study to 54% in the current study and a decrease from 30% in the Misener study to 12% in the current study for administrative time.

The unavailable for care category was responsible for 23% of the wardclerks' time in the Misener study for data attributable to BAMC; 12% personal and 10% offunit. This category accounted for 28% of the wardclerks' time in the current study; 19% personal and 9% offunit. The CHI-Square value of 1.600, with 2 degrees of freedom does not allow the hypothesis: percentage of time unavailable for care in the Misener study for the data attributable to wardclerks at BAMC is not significantly different than the percentage of time unavailable for care for wardclerks in the current study to be rejected.

WARDCLERKS: UNAVAILABLE FOR CARE TIME

OBSERVED VALUES (Cell format: count/percent;total/ percent;row/ percent;col)

	MISENER: CURRENT		
	BAMC(1)	BAMC	TOTAL
PERSONAL	12	19	31
TIME	6.20	9.45	15.65
	39.62	60.38	
	12.40	18.90	
OFFUNIT	10	9	20
TIME	5.10	4.70	9.80
	52.04	47.96	
	10.20	9.40	
OTHER	77	72	149
TIME	38.70	35.85	74.55
	51.91	48.09	
	77.40	71.70	
TOTAL	100	100	200
	50.00	50.00	100.00

CHI-SQUARE = 1.600, D.F. = 2, PROB. = .4492

(1) Misener, Table 12, Page 17-1

Table 30

The slack time category accounted for 15% of wardclerks' time in the Misener study; 12% in personal time and 3% in wait time. In the current study this was 22% of the total; 19% in personal time and 3% in wait time. The CHI-Square value of 1.650 with 2 degrees of freedom does not allow the null hypothesis: slack time for wardclerks in the data attributable to BAMC in the Misener study is not significantly different than slack time for wardclerks in the current study to be rejected.

WARDCLERKS: SLACK TIME			
OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)			
	MISENER: BAMC(1)	CURRENT: BAMC	TOTAL
PERSONAL TIME	12/ 6.20/ 39.62/ 12.40	19/ 9.45/ 60.38/ 18.90	31/ 15.65
WAIT TIME	3/ 1.25/ 47.17/ 2.50	3/ 1.40/ 52.83/ 2.80	5/ 2.65
OTHER TIME	85/ 42.55/ 52.08/ 85.10	78/ 39.15/ 47.92/ 78.30	163/ 81.70
TOTAL	100/ 50.00	100/ 50.00	200/ 100.00
CHI-SQUARE = 1.650, D.F. = 2, PROB. = .4383			
(1) Misener, Table 12, Page 17-1			

Table 31

Registered Nurses

Registered nurses in the current study spent 28.8% of their time in direct care. Of the 61.1% spent in indirect care, 33.2% was clerical, 17.6% was time spent preparing supplies and equipment, 16.1% of the time was spent in communicative activities, 11.6% waiting, 14.7% in conferences, 2.7% performing administrative tasks, 1.2% in travel, and 2.9 in environmental activities. Of the 10.1% spent in the unavailable for care category, 8.4% was personal time and 1.7% off the unit.

REGISTERED NURSES	
DIRECT	28.8%
INDIRECT	61.1%
Clerical	33.2%
Prep	17.6%
Commun	16.1%
Wait	11.6%
Confer	14.7%
Admin	2.7%
Travel	1.2%
Envir	2.9%
UNAVAILABLE	10.1%
Personal	8.4%
Offunit	1.7%

Table 32

Registered nurses in the Misener study spent 27% of their time in direct care, 62% in indirect care, and 11% of their time was in the unavailable for care category. In that portion of the Misener study attributable to registered nurses at BAMC, 33% was in direct care activities, 59% in indirect care and 8% was unavailable for care. The current study showed that 29% of registered nurses time was spent in direct care, 61% in indirect care and 10% unavailable for care. As shown in Table 33,

REGISTERED NURSES COMPARISON BETWEEN MISENER, MIS
BAMC, CURRENT
OBSERVED VALUES (Cell format: count/ percent:total/
percent:row/ percent:col)

	MISENER (1)	MISENER BAMC(2)	CURRENT BAMC CC	TOTAL
DIRECT	27 8.83 30.08 26.50	33 10.90 37.12 32.70	29 9.53 32.80 28.90	88 29.37
INDIRECT	62 20.70 34.03 62.10	59 19.77 32.49 59.30	61 20.37 33.48 61.10	183 60.83
UNAVAIL	11 3.80 38.78 11.40	8 2.67 27.21 8.00	10 3.33 34.01 10.00	29 9.80
TOTAL	100 33.33	100 33.33	100 33.33	300 100.00

CHI-SQUARE = 1.328, D.F. = 4, PROB. = .8567

(1) Misener, Table 13, Page 32

(2) Misener, Table 12, Page 17-1

Table 33

there is not a significant difference between the samples as a Chi-Square value of 1.328, with 4 degrees of freedom. This does not allow rejection of the null hypothesis: There is no difference in the percentage of direct care, indirect care, and unavailable for care time for registered nurses between the Misener study data, the Misener BAMC data, and the current study.

Ranking of the categories of indirect care reveals that 33% of the indirect care time was spent in clerical, or charting, activities, 18% in preparation of supplies and equipment, 16% performing communicative activities, 15% in conferences, 12% waiting, 3% in both administrative and environmental activities, and 1% traveling.

The percentages are compared to the percentages for indirect care for the Misener data and the Misener data for BAMC, as shown in the CHI Square analysis, resulting in a CHI Square value of 22.883 with fourteen degrees of freedom. The null hypothesis: percentage of the temporal categories of indirect care time for registered nurses in the

	MIS (1)	BAMC(2)	CURRENT	TOTAL
COMMUN	20	20	16	56
	6.60	6.80	5.36	18.76
	35.17	36.23	28.60	
	19.78	20.40	16.10	
PREP	11	12	18	40
	3.53	4.07	5.86	13.46
	26.24	30.20	43.56	
	10.59	12.20	17.60	
CLER	25	22	33	80
	8.30	7.40	11.06	26.76
	31.01	27.65	41.34	
	24.88	22.20	33.20	
CONF	8	9	15	31
	2.60	2.83	4.90	10.33
	25.16	27.42	47.42	
	7.79	8.50	14.70	
TRAV	13	12	1	26
	4.30	3.93	.40	8.63
	49.81	45.56	4.63	
	12.89	11.80	1.20	
ADMIN	10	9	3	22
	3.43	2.83	.90	7.16
	47.91	39.53	12.56	
	10.29	8.50	2.70	
ENVIR	1	2	3	6
	.43	.63	.97	2.03
	21.31	31.15	47.54	
	1.30	1.90	2.90	
WAIT	13	15	12	39
	4.17	4.83	3.87	12.86
	32.38	37.56	30.05	
	12.49	14.50	11.60	
TOTAL	100	100	100	300
	33.36	33.32	33.32	100.00
CHI-SQUARE = 22.883, D.F. = 14, PROB. = .0622				
(1) Misener, Table 22, Page 41 (2) Table 22, Page 17-B				

Table 34

current study is not significantly different than the percentage of the temporal categories of indirect care time for registered nurses in the Misener study or in that portion of the Misener data attributable to BAMC cannot be rejected.

The unavailable for care category was responsible for 8% of the registered nurses' time in the Misener study for data attributable to BAMC; 6% personal and 2% offunit. This category accounted for 10% of the registered nurses' time in the current study; 8% personal and 2% offunit. The CHI-Square value of .503, with 2 degrees of freedom does not allow the hypothesis: percentage of time unavailable for care in the Misener study for the data attributable to registered nurses at BAMC is not significantly different than the percentage of time unavailable for care for registered nurses in the current study to be rejected.

REGISTERED NURSES: UNAVAILABLE FOR CARE TIME			
OBSERVED VALUES (Cell format: count/ percent;total/ percent;row/ percent;col)			
	MISENER: BAMC(1)	CURRENT: BAMC	TOTAL
PERSONAL	6	6	14
TIME	2.95	4.20	7.15
	41.26	58.74	
	5.90	8.40	
OFFUNIT	2	2	4
TIME	1.05	.85	1.90
	55.26	44.74	
	2.10	1.70	
OTHER	92	90	182
TIME	46.00	44.95	90.95
	50.58	49.42	
	92.00	89.90	
TOTAL	100	100	200
	50.00	50.00	100.00
CHI-SQUARE = .503, D.F. = 2, PROB. = .7775			
(1) Misener, Table 12, Page 17-1			

Table 35

The slack time category accounted for 14% of registered nurses' time in the Misener study; 6% in personal time and 9% in wait time. In the current study this was 20% of the total; 8% in personal time and 12% in wait time. The CHI-Square value of 1.065 with 2 degrees of freedom does not allow the null hypothesis: slack time for registered nurses in the data attributable to BAMC in the Misener study is not significantly different than slack time for registered nurses in the current study to be rejected.

REGISTERED NURSES: SLACK TIME			
OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)			
	MISENER: BAMC(1)	CURRENT: BAMC	TOTAL
PERSONAL:	6	8	14
TIME:	2.95	4.20	7.15
	41.26	58.74	
	5.90	8.40	
WAIT:	9	12	20
TIME:	4.30	5.80	10.10
	42.57	57.43	
	8.60	11.60	
OTHER:	86	80	166
TIME:	42.75	40.00	82.75
	51.66	48.34	
	85.50	80.00	
TOTAL:	100	100	200
	50.00	50.00	100.00
CHI-SQUARE = 1.065, D.F. = 2, PROB. = .5870			
(1) Misener, Table 12, Page 17-1			

Table 36

Civilian Licensed Practical Nurses

Civilian licensed practical nurses in the current study spent 22.8% of their time in direct care. Of the 61% spent in indirect care, 25.1% was clerical, 11.6% was time spent preparing supplies and equipment, 7.0% of the time was spent in communicative activities, 4.2% waiting, 7.3% in conferences, none was spent performing administrative tasks, 1.2% in travel, and 2.9 in environmental activities. Of the 16.2% spent in the unavailable for care category, 16.2% was personal time and none was off the unit.

CIVILIAN LICENSED PRACTICAL NURSES

DIRECT	22.8%
INDIRECT	61.0%
Clerical	25.1%
Prep	11.6%
Commun	7.0%
Wait	4.2%
Confer	7.3%
Admin	0%
Travel	1.2%
Envir	2.9%
UNAVAILABLE	16.2%
Personal	16.2%
Offunit	0%

Table 32

Civilian licensed practical nurses in the Misener study spent 29% of their time in direct care, 58% in indirect care, and 13% of their time was in the unavailable for care category. In that portion of the Misener study attributable to licensed practical nurses at BAMC, 25% was in direct care activities, 68% in indirect care and 7% was unavailable for care. The current study showed that 23% of civilian licensed practical nurses time was spent in direct care, 61% in indirect care

and 16% unavailable for care. As shown in Table 38 there is not a significant difference between the samples as a Chi-Square value of 5.405, with 4 degrees of freedom. This does not allow rejection of the null hypothesis: there is no difference in the percentage of direct care, indirect care, and unavailable for care time for licensed practical nurses between the Misener study data, the Misener BAMC data, and the current study.

CIVILIAN LICENSED PRACTICAL NURSES: MIS, MIS BAMC, CURRENT

OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)

	MISENER (1)	MISENER BAMC(2)	CURRENT BAMC CC	TOTAL
DIRECT	29 9.63 37.73 28.90	25 8.30 32.51 24.88	23 7.60 29.77 22.80	77 25.52
INDIRECT	58 19.46 31.10 58.40	68 22.79 36.42 68.33	61 20.33 32.48 61.00	188 62.58
UNAVAIL	13 4.23 35.57 12.70	7 2.27 19.05 6.79	16 5.40 45.38 16.20	36 11.90
TOTAL	100 33.32	100 33.36	100 33.32	300 100.00

CHI-SQUARE = 5.405, D.F. = 4, PROB. = .2482

(1) Misener, Table 13, Page 32

(2) Misener, Table 12, Page 17-1

Table 38

Civilian licensed practical nurses spent 41% of their indirect care time in clerical, or patient charting, activities. They spent 19% of their time preparing supplies and equipment, 12% in conferences, 11% in communicative activities, 7% waiting, 5% traveling and 2% in environmental activities.

The percentages are compared to the percentages for indirect care for the Misener data and the Misener data for BAMC as shown in the CHI Square analysis at Table 39 resulting in a CHI Square value of 60.865 with fourteen degrees of freedom. The null hypothesis: percentage of the temporal categories of indirect care time for licensed practical nurses in the current study is not

	MIS (1)	BAMC(2)	CURRENT	TOTAL
COMMUN:	14	13	11	38
	4.68	4.35	3.68	12.71
	36.84	34.21	28.95	
	14.14	13.00	11.00	
PREP:	10	12	19	41
	3.34	4.01	6.35	13.71
	24.39	29.27	46.34	
	10.10	12.00	19.00	
CLER:	15	12	41	68
	5.02	4.01	13.71	22.74
	22.06	17.65	60.29	
	15.15	12.00	41.00	
CONF:	5	6	12	23
	1.67	2.01	4.01	7.69
	21.74	26.09	52.17	
	5.05	6.00	12.00	
TRAV:	21	20	8	49
	7.02	6.69	2.68	16.39
	42.86	40.82	16.33	
	21.21	20.00	8.00	
ADMIN:	6	1	0	7
	2.01	.33	.00	2.34
	85.71	14.29	.00	
	6.06	1.00	.00	
ENVIR:	6	7	2	15
	2.01	2.34	.67	5.02
	40.00	46.67	13.33	
	6.06	7.00	2.00	
WAIT:	22	29	7	58
	7.36	9.70	2.34	19.40
	37.93	50.00	12.07	
	22.22	29.00	7.00	
TOTAL:	99	100	100	299
	33.11	33.44	33.44	100.00
CHI-SQUARE = 60.865, D.F. = 14, PROB. = 8.267E-08				
(1) Misener, Table 22, Page 41 (2) Table 22, Page 17-R				

Table 39

significantly different than the percentage of the temporal categories of indirect care time for licensed practical nurses in the Misener study or in that portion of the Misener data attributable to BAMC is rejected.

The categories of indirect care time that contributed most to the significance of the differences are the increase from 15% to 41% in clerical, or charting time and the decreases from 21% to 8% in travel time and from 22% to 7% in wait time.

The unavailable for care category was responsible for 7% of the civilian licensed practical nurses' time in the Misener study for data attributable to BAMC; 6% personal and 1% offunit. This category accounted for 16% of the civilian licensed practical nurses' time in the current study; all in personal time. The CHI-Square value of 6.853, with 2 degrees of freedom allows the hypothesis: percentage of time unavailable for care in the Misener study for the data attributable to civilian licensed practical nurses at BAMC is not significantly different than the percentage of time unavailable for care for civilian licensed practical nurses in the current study to be rejected.

LICENSED PRACTICAL NURSES:
UNAVAILABLE FOR CARE TIME

OBSERVED VALUES (Cell format: count/
percent:total/ percent:row/ percent:col)

	MISENER BAMC(1)	CURRENT BAMC	TOTAL
PERSONAL TIME	6 2.80 25.69 5.60	16 8.10 74.31 16.20	22 10.90
OFFUNIT TIME	1 .60 100.00 1.20	0 .00 .00 .00	1 .60
OTHER TIME	93 46.60 52.66 93.20	84 41.90 47.34 83.80	177 88.50
TOTAL	100 50.00	100 50.00	200 100.00

CHI-SQUARE = 6.853, D.F. = 2, PROB. = .0325

(1) Misener, Table 12, Page 17-1

Table 40

CHAPTER

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APPENDICES

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The slack time category accounted for 26% of civilian licensed practical nurses' time in the Misener study; 6% in personal time and 20% in wait time. In the current study this was 20% of the total; 16% in personal time and 4% in wait time. The CHI-Square value of 15.740 with 2 degrees of freedom allows the null hypothesis: slack time for civilian practical nurses in the data attributable to BAMC in the Misener study is not significantly different than slack time for civilian licensed practical nurses in the current study to be rejected.

LICENSED PRACTICAL NURSES: SLACK TIME

OBSERVED VALUES (Cell format: count/
percent:total/ percent:row/ percent:col)

	MISENER	CURRENT	
	BAMC(1)	BAMC	TOTAL
PERSONAL	6	16	22
TIME	2.80	8.10	10.90
	25.69	74.31	
	5.60	16.20	
WAIT	20	4	24
TIME	10.05	2.10	12.15
	82.72	17.28	
	20.10	4.20	
OTHER	74	80	154
TIME	37.15	39.80	76.95
	48.28	51.72	
	74.30	79.60	
TOTAL	100	100	200
	50.00	50.00	100.00

CHI-SQUARE=15.740, D.F.=2, PROB.=3.020E-04
(1) Misener, Table 12, Page 17-1

Table 41

Practical Nurse Specialists, 91C's

Practical nurse specialists (91C's) in the current study spent 24.3% of their time in direct care. Of the 65.7% spent in indirect care, 21.8% was clerical, 13.9% was time spent preparing supplies and equipment, 4.3% of the time was spent in communicative activities, 8.9% waiting, 6.1% in conferences, 3.2% was spent performing administrative tasks, 3.6% in travel, and 2.9% in environmental activities. Of the 10% spent in the unavailable for care category, 9.6% was personal time and .4% was off the unit.

PRACTICAL NURSE SPECIALISTS, 91C'S	
DIRECT	24.3%
INDIRECT	65.7%
Clerical	21.8%
Prep	13.9%
Commun	4.3%
Wait	8.9%
Confer	6.1%
Admin	3.2%
Travel	3.6%
Envir	2.9%
UNAVAILABLE	10.0%
Personal	9.6%
Offunit	.4%

Table 42

Practical nurse specialists (91C's) in the Misener study spent 31% of their time in direct care, 52% in indirect care, and 18% of their time was in the unavailable for care category. In that portion of the Misener study attributable to practical nurse specialists at BAMC, 38% was in direct care activities, 46% in indirect care and 16% was unavailable for care. The current study showed that 24% of practical nurse specialists time was spent in direct care, 66% in indirect care and 10%

unavailable for care. As shown in Table 43 there is not a significant difference between the samples as a Chi-Square value of 8.702, with 4 degrees of freedom. This does not allow rejection of the null hypothesis: There is no difference in the percentage of direct care, indirect care, and unavailable for care time for practical nurse specialists between the Misener study data, the Misener BAMC data, and the current study.

91C: COMPARISON BETWEEN MISENER, MISENER BAMC, CURRENT

OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)

	MISENER (1)	MISENER BAMC (2)	CURRENT BAMC CC	TOTAL
DIRECT	31 10.17 33.01 30.50	38 12.53 40.69 37.60	24 8.10 26.30 24.30	92 30.80
INDIRECT	52 17.30 31.65 51.90	46 15.47 28.29 46.40	66 21.90 40.06 65.70	164 54.67
UNAVAIL	18 5.87 40.37 17.60	16 5.33 36.70 16.00	10 3.33 22.94 10.00	44 14.53
TOTAL	100 33.33	100 33.33	100 33.33	300 100.00

CHI-SQUARE = 8.702, D.F. = 4, PROB. = .0690

(1) Misener, Table 13, Page 32

(2) Misener, Table 12, Page 17-1

Table 43

Analysis of the indirect care category shows that 33% of the indirect care time was spent in clerical activities, 21% in preparation of supplies and equipment, 14% waiting, 9% in conferences, 7% in communicative activities, 6% in environmental activities, and 5% in both administrative activities and travel time.

The percentages are compared to the percentages for indirect care for the Misener data and the Misener data for BAMC as shown in the CHI Square analysis in Table 44, resulting in a CHI Square value of 28.804 with fourteen degrees of freedom. The null hypothesis: percentage of the temporal categories of indirect care

	MIS (1)	BAMC(2)	CURRENT	TOTAL
COMMUN	13	17	7	36
	4.30	5.57	2.17	12.03
	35.73	46.26	18.01	
	12.90	16.70	6.50	
PREP	14	14	21	49
	4.53	4.70	7.07	16.30
	27.81	28.83	43.35	
	13.60	14.10	21.20	
CLER	15	18	33	66
	5.00	5.97	11.07	22.03
	22.69	27.08	50.23	
	15.00	17.90	33.20	
CONF	5	7	9	21
	1.70	2.20	3.07	6.97
	24.40	31.58	44.02	
	5.10	6.60	9.20	
TRAV	23	17	5	46
	7.80	5.73	1.80	15.33
	50.87	37.38	11.74	
	23.40	17.20	5.40	
ADMIN	9	8	5	21
	2.87	2.53	1.63	7.03
	40.76	36.02	23.22	
	8.60	7.60	4.90	
ENVIR	5	5	6	16
	1.77	1.67	2.00	5.43
	32.52	30.67	36.81	
	5.30	5.00	6.00	
WAIT	16	15	14	45
	5.37	4.97	4.53	14.87
	36.10	33.41	30.49	
	16.10	14.90	13.60	
TOTAL	100	100	100	300
	33.33	33.33	33.33	100.00
CHI-SQUARE = 28.804, D.F. = 14, PROB. = .0111				
(1) Misener, Table 22, Page 14 (2) Table 22, Page 17-R				

Table 44

time for practical nurse specialists, 91C's, in the current study is not significantly different than the percentage of the temporal categories of indirect care time for wardmasters in the Misener study or in that portion of the Misener data attributable to BAMC is rejected.

The unavailable for care category was responsible for 16% of the practical nurse specialists' time in the Misener study for data attributable to BAMC; 8% personal and 8% offunit. This category accounted for 10% of the practical nurse specialists' time in the current study; 10% in personal time and less than 1% in offunit time. The CHI-Square value of 7.589, with 2 degrees of freedom allows the hypothesis: percentage of time unavailable for care in the Misener study for the data attributable to practical nurse specialists at BAMC is not significantly different than the percentage of time unavailable for care for practical nurse specialists in the current study to be rejected.

PRACTICAL NURSE SPECIALISTS, 91C'S:
UNAVAILABLE FOR CARE

OBSERVED VALUES (Cell format: count/
percent:total/ percent:row/ percent:col)

	MISENER: BAMC(1)	CURRENT: BAMC	TOTAL
PERSONAL:	8	10	17
TIME:	3.85	4.80	8.65
	44.51	55.49	
	7.70	9.60	
OFFUNIT:	8	0	9
TIME:	4.15	.20	4.35
	95.40	4.60	
	8.30	.40	
OTHER:	84	90	174
TIME:	42.00	45.00	87.00
	48.28	51.72	
	84.00	90.00	
TOTAL:	100	100	200
	50.00	50.00	100.00

CHI-SQUARE = 7.589, D.F. = 2, PROB. = .0225

(1) Misener, Table 12, Page 17-1

Table 45

specialists in the current study to be rejected.

The slack time category accounted for 15% of practical nurse specialists' time in the Misener study; 8% in personal time and 7% in wait time. In the current study this was 19% of the total; 10% in personal time and 9% in wait time. The CHI-Square value of .553 with 2 degrees of freedom does not allow the null hypothesis: slack time for practical nurse specialists in the data attributable to BAMC in the Misener study is not significantly different than slack time for practical nurse specialists in the current study to be rejected.

PRACTICAL NURSE SPECIALISTS, 910'S: SLACK TIME			
OBSERVED VALUES (Cell format: count/ percent:total/ percent:row/ percent:col)			
	MISENER: BAMC(1)	CURRENT: BAMC	TOTAL
PERSONAL:	8	10	17
TIME:	3.85	4.80	8.65
	44.51	55.49	
	7.70	9.60	
WAIT:	7	9	16
TIME:	3.45	4.45	7.90
	43.67	56.33	
	6.90	8.90	
OTHER:	85	82	167
TIME:	42.70	40.75	83.45
	51.17	48.83	
	85.40	81.50	
TOTAL:	100	100	200
	50.00	50.00	100.00
CHI-SQUARE = .553, D.F. = 2, PROB. = .7584			
(1) Misener, Table 12, Page 17-1			

Table 46

RELATIONSHIPS BETWEEN THE VARIABLES

A correlation matrix was prepared for this analysis. Several variables were not included in the matrix because correlation of these would provide no pertinent information. Date, bed number and provider number are examples of this phenomena. A vector for patients that were in the least acute category was not included because no patients met this criteria.

Correlation - Shift

Shift was coded 1=day, 2=evening, and 3=night. There was a significant positive relationship between shift and patients in the two categories that require the most nursing care: acuity category five (ACUITY5) and acuity category six (ACUITY6), and with total acuity (TOTACUIT). A possible explanation could be that patients are recoded daily during the dayshift and carry that code through the night. If the code is changed it is usually downgraded, but not until the next day. Additionally the units have the practice of coding all patients when they are admitted as a category 6 to compensate for the intense amount of nursing initially needed. The acuity is recalculated the next day at midday. Shift was also positively related to the licensed practical nurse (LPN) category and specifically to civilian licensed practical nurses (CIVLPN) which would indicate a greater presence of LPNs on the evening shift than on the day and a greater presence at night than in the evening or in the day.

Shift also had a significant positive relationship with time spent in conference (CON).

Shift had a significant negative relationship with the following categories of personal: headnurses, wardmasters, agency nurses, military 91C students, wardclerks, and reservists. These category of personnel were significantly more likely to work day shift than evening or night, and evening than night. Shift had a significant negative relationship with personal time (PERSONAL). This may be related to staffing patterns because there are many more people on the day shift than on the night shift. This allows staff working on the day shift to take a break which may not be possible on the night shift. What is not explained is that patients who are recuperating are encouraged to sleep during the night shift which would seem to allow a greater opportunity for the staff to take a break. Shift also had a significant negative relationship with wait time or time spent waiting for something to do (WAIT). This is a further indicator of the difference in the staffing levels depending upon the shift. Shift also showed a significant negative correlation to administrative time (ADMIN). This is explained by the scheduling of those personnel who perform most of the administrative functions primarily on days. The headnurse, who accounts for much of the administrative time, is only scheduled for days. The wardclerks, who account for administrative time are scheduled only on the day and evening shifts. Wardmasters are scheduled

primarily on day shift, although there was an occurrence of the wardmaster working on another shift.

Correlation - Headnurse

Headnurse was a binary element and there was only one headnurse assigned per unit. Charge nurses were not included in the headnurse category.

Headnurse showed a significant positive correlation with time spent in offunit activities (OFFUNIT), administrative time (ADMIN), total indirect care time (TOTIND), total indirect care time minus offduty time (TIND-OD) and consequently the relationship between indirect time and total time (IND/ALL).

Headnurse showed a significant negative correlation with time spent performing direct care tasks (DIRECT) and consequently with the ratio of direct care to total time (DIR/TALL). Headnurse also showed a significant negative correlation with time spent performing clerical functions, primarily charting (CLER). Since the headnurse is not usually assigned to a patient, the total acuity score (TOTSCORE) also showed a significant negative correlation.

Correlation - Wardmaster

Wardmaster was coded as a binary vector and only one wardmaster was assigned to a unit. Wardmaster showed a significant positive relationship with time spent traveling from one location to another (TRAV), administrative time (ADMIN), and time spent performing environmental tasks (ENVIR). Since the

role is primarily administrative, total time spent in the indirect category (TOTIND) showed positive significance and direct care time (DIRECT) showed negative significance. As with the headnurse, wardmaster showed negative significant with clerical time, primarily time spent charting.

Correlation - MILRN

Military registered nurse (MILRN) was a binary coded vector with each nurse and the amount of time spent in each category coded independently for each observation period. Military registered nurses showed a positive correlation with the second highest acuity category (ACUITY5) and total acuity (TOTACUIT) and a negative correlation with the ratio of indirect care time to total time (IND/ALL).

Correlation - MRNSTU

Military registered nurse students of the intensive care course showed a significant positive correlation with time spent waiting for something to do. These students showed a negative correlation with total acuity (TOTACUIT). This can be explained in part because the patient and that patient's acuity were assigned to the nurse who had responsibility, regardless of who actually provided the care. Each element of care was assigned independently.

Correlation - CIVRN

Civilian registered nurses (CIVRN) showed a significant positive relationship with patients assigned in the most severe

category (ACUITY6), with total acuity (TOTACUIT). They also were only one of two categories of provider that showed a significant positive relationship with direct care time (DIRECT). They also showed a significant negative relationship with total time spent in indirect care (TOTIND).

Correlation - CIVLPN

Civilian licensed practical nurses showed a positive correlation with total patient acuity (TOTACUIT). They also showed a significant positive relationship with personal time (UNAVAIL) and with SHIFT. They showed a significant negative relationship to time spent in administration (ADMIN) and time spent waiting (WAIT).

Correlation - MIL91C

Military practical nurse specialists showed a significant positive correlations with patients in the ACUITY3 category and total patients acuity (TOTACUIT). They showed a significant negative correlation in time spent in communication activities (COMMUN).

Correlation - Agency

Agency nurses had a high positive correlation with patients in the second lowest acuity category (ACUITY2), however, there was only one patient in this category. There was also a significant positive relationship with time spent in direct care (DIRECT), total time minus offduty time (TALL-OD), and the ratio of direct time to total time (DIR/TALL).

Agency nurses had a significantly negative correlation with shift.

Correlation - M91STU

Students in the practical nurse specialist course had a positive correlation with personal time (UNAVAIL) and with time waiting (WAIT).

This category of personnel had a significant negative relationship with total acuity (TOTACUIT) due to the patient's acuity being assigned to the primary nurse; and with time spent preparing supplies and equipment for use (PREP); clerical time (CLER), and shift.

Correlation - Wardclerk

Wardclerks showed a significant positive correlation with personal time (UNAVAIL), time spent off the unit (OFFUNIT), clerical time (CLER), administrative time (ADMIN), and with the totals in indirect care and high indirect ratio. By definition there was a negative correlation with direct care and the acuity categories. There was also a negative correlation with shift.

Correlation - Volunt

Volunteers showed a significant positive correlation with travel time and a negative correlation, by definition, with direct care and the acuity categories.

Correlation - Reserve

Reservist showed a significant positive relationship with personal time (UNAVAIL) and a significant negative relationship

with shift.

Correlation - ACUITY2

Acuity 2 showed a significant positive relationship with the Agency nurse category. However there was only one patient in this category.

Correlation - ACUITY3

Acuity 3 showed a significant positive relationship with licensed practical nurses (LPN) which included both civilian and 91C's and with military practical nurse specialists (MIL91C) .

Correlation - ACUITY4

Acuity 4 showed a significant positive relationship with licensed practical nurses (LPN) and with civilian licensed practical nurses (CIVLPN) and with military practical nurse specialists (MIL91C).

Correlation - ACUITY5

Acuity 5 showed a significant positive relationships with licensed practical nurses (LPN), with civilian licensed practical nurses (CIVLPN) and with military practical nurse specialists (MIL91C). There was also a significant positive relationship with direct care time (DIRECT).

Correlation - ACUITY6

Acuity 6 showed a significant positive relationships with registered nurses (RN), with civilian registered nurses (CIVRN). There was also a significant positive relationship with direct care time (DIRECT).

Correlation - TOTACUIT

Total acuity showed a significant positive correlation with time spent in direct care (DIRECT), time spent preparing supplies and equip (PREP), clerical time (CLER), total care time minus off duty time (TALL-OD), and the ratio of direct care time to total time. There was also significant positive correlation found between total acuity and registered nurses (RN) and licensed practical nurses (LPN), particularly military registered nurses, civilian registered nurses, civilian licensed practical nurses, and 91C's.

Total acuity showed a significant negative correlation with offunit activities (OFFUNIT), time spent in conference (CON), administrative time (ADMIN), total indirect care time (TOTIND), and the ratio of indirect care time to total time. There was also a significant negative correlation between total acuity (TOTACUIT) and being a student (STU) or in an administrative position (ADMIN), particularly a headnurse, wardmaster, registered nurse intensive care student, or a 91C student.

Correlation - DIRECT

Direct care time (DIRECT) has a significant positive correlation with being a registered nurse (RN), particularly a civilian registered nurse (CIVRN) or an agency nurse (AGENCY), total care time minus off duty time (TALL-OD), and the direct care to total care ratio (DIR/TALL). Direct care time was also positively related to the two most acute categories: Acuity 5 and

6 and with total acuity (TOTACUIT).

Direct care time showed a significant negative correlation with time unavailable for care (UNAVAIL), offunit time (OFFUNIT), communication time (COMMUN), clerical time (CLER), time spent in conferences (CON), time spent traveling from one location to another (TRAV), administrative time (ADMIN), wait time (WAIT), total indirect care (TOTIND), total indirect care time minus offduty time (TIND-OD), and the ratio of indirect care time to total time (IND/ALL). Direct care time also showed a significant negative correlation with personnel in administrative categories (ADMIN), specifically headnurses, wardmasters, and wardclerks.

Correlation - Personal

Personal time was positively related to the total amount of indirect care time (TOTIND), the ratio of total indirect care time to total time (IND/ALL), and assignment of a patient in acuity category four (ACUITY4). Personal time was also positively correlated with civilian licensed practical nurses, 91C students, and wardclerks.

Personal time was negatively related to direct care time (DIRECT), time spent preparing supplies and equipment (PREP), time spent in conference (CON), and ratio of direct care time to total time (DIR/TALL).

Correlation - OFFUNIT

Time spent off the nursing unit (OFFUNIT) was positively correlated with total indirect care time (TOTIND), with the ratio

of indirect time to total time (IND/ALL), and with being in an administrative capacity (ADMIN), particularly as a headnurse or a wardclerk.

Time spent off the nursing unit (OFFUNIT) was negatively correlated with time spent performing clerical tasks, particularly charting (CLER), what shift it was (SHIFT), total acuity (TOTACUIT), direct care time (DIRECT).

Correlation - COMMUN

Communication activities (COMMUN) were significantly correlated so that as communications activities increased or decreased total indirect care time (TOTIND), the ratio of indirect care time to total care time, and being a registered nurse increased or decreased correspondingly.

Communication activities (COMMUN) were significantly correlated so that as communications activities increased or decreased the ratio of direct to total care hours (DIR/TALL), being a licensed practical nurse (LPN), specifically a 91C, and direct care time (DIRECT) increased or decreased in the opposite direction.

Correlation - PREP

Time spent preparing supplies and equipment (PREP) shows a significant positive correlation with total acuity (TOTACUIT).

Time spent preparing supplies and equipment (PREP) shows a significant negative correlation with time spent performing clerical tasks (CLER), time spent waiting (WAIT), time

unavailable for care (UNAVAIL), and time spent in communications activities (COMMUN). There was also a significant negative correlation between time spent preparing supplies and equipment and administrative personnel (ADMIN), particularly wardclerks. Additionally 91C students showed a significant negative correlation.

Correlation - CLER

Time spent in clerical activities, primarily charting (CLER), showed a significant positive correlation with total indirect care time (TOTIND), with personnel in the administrative category (ADMIN), particularly wardclerks, as headnurses and wardmasters showed a significantly negative relationship. There was also a significant positive relationship with total acuity (TOTACUIT).

A significant negative relationship was found with direct care time (DIRECT), time spent in conferences (CON), administrative time (ADMIN), time spent waiting (WAIT), time spent off the unit (OFFUNIT), time spent preparing equipment and supplies (PREP).

Correlation - CON

Time spent in conferences (CON) showed a significant positive relationship with total indirect time (TOTIND) and the ratio of indirect care time to total time (IND/ALL), and with shift.

Time spent in conferences (CON) showed a significant

negative relationship with time spent traveling from one place to another (TRAV), ratio of direct care time to total time, direct care time (DIRECT), personal time (UNAVAIL), and clerical time (CLER).

Correlation - TRAV

Time spent travelling from one location to another (TRAV) was positively correlated to time spent in environmental tasks (ENVIR) with total indirect care time (TOTIND) and the ratio of indirect care time to total time (IND/ALL). Travel time was also positively related to wardmaster, LPN, and ADMIN.

Time spent travelling from one location to another (TRAV) was negatively correlated to direct care (DIRECT), to the ratio of direct care to total care (DIR/TALL), time in conferences (CON) and to RN, wardmaster, and volunteer.

Correlation - ADMIN

Administrative time (ADMIN) was positively correlated with total indirect care time (TOTIND) and the ratio of indirect to total time (IND/ALL). It is also positively correlated with being in an administrative role (ADMIN).

Administrative time (ADMIN) was negatively correlated with the ratio of direct care time to total time (DIR/TALL), shift, personnel who were civilian licensed practical nurses (CIVLPN), agency nurses (AGENCY), acuity category five (ACUITY5), total acuity (TOTACUIT), direct care (DIRECT), and clerical time (CLER).

Correlation - ENVIR

Time spent performing environmental tasks were significantly correlated with staff members who were LPNs, particularly wardmasters. There was also a positive correlation with the incidence of patients in category three (ACUITY3). This could partially be explained by there being time to perform this activity when the unit has a high number of patients in this category, as they are the least ill that are normally placed in the intensive care unit. There was also a positive relationship with travel time.

There was a negative relationship between environmental tasks and clerical tasks (CLER).

Correlation - WAIT

There was a positive correlation between time spent waiting for the next task (WAIT) with total indirect care time (TOTIND). There was also a positive relationship with personnel in the STU category. A possible explanation for this is that students are not allowed to act independently and must wait for their actions to be directed.

There was a negative correlation with the ratio of direct care time to total time (DIR/ALL). There is also a negative relationship with SHIFT which could be attributable to the reduction in the number of personnel available on each subsequent shift. There is also a negative relationship between wait time and civilian licensed practical nurses which is especially

interesting considering that this group had a positive relationship with personal time. There is a negative relationship with direct care time which could be because if there is direct care that needs to be performed, it is done and there is not time available to wait. There are also negative relationships with time spent preparing supplies and equipment (PREP) and clerical time (CLER).

Correlation - TOTIND

Total time spent in indirect care was significantly positively related to personnel in the ADMIN category.

PREDICTORS OF DIRECT CARE TIME

Regression Analysis was undertaken to determine what would cause an increase or decrease in direct care time. Since the correlation showed where there were relationships between variables, regression was used to determine causality. A model was constructed using 25 variables: the variable for unit, shift, eleven of the twelve variables for the categories of personnel, the variable that accounted for total acuity, and eleven of the twelve temporal categories. One less than the total number of personnel categories and temporal categories were used to avoid a singular matrix. The restriction of one category causes no change in the value.

Significance was obtained with this model with $F=68.754$ (24.316) such that there was less than a 5% probability that this was due to chance. The r^2 value showed that .8393 of the variability had been accounted for.

It was important to examine the significance of each variable and the contribution to the explanation of the variability. The variables that showed significance and the contribution to the explanation of the variability are shown in

SIGNIFICANT PREDICTORS OF DIRECT CARE TIME		
Variable	Contribution to R-Square	Direction of Relationship
TOTACUIT	.1726	POS
MRNSTU	.2089	POS
CLER	.2439	NEG
COMMUN	.2835	NEG
WAIT	.3325	NEG
PERSONAL	.3779	NEG
CON	.4337	NEG
TRAV	.4882	NEG
PREP	.5303	NEG
OFFUNIT	.5930	NEG
ADMIN	.6427	NEG

Table 47

the inset in the order they were selected for the stepwise regression. The remaining variables contributed the difference between the r^2 value of .6427 and .8393.

COMPARISON OF THE TWO UNITS

Data from each of the two units were compared to determine if the percentages of time spent in the three categories was

	Number of Observations		Percent Observations	
Direct	228	26.8%	221	21.1%
Indirect	502	59.0%	704	67.2%
Unavail	121	14.2%	123	11.7%

Table 48

different. As shown in

Table 48, Unit 1 spent 26.8% of the time in direct care versus Unit 2 where 21.1% of the time was spent in direct care. Unit 1 spent 59% of the time performing indirect care tasks versus 67.2% of the time spent by Unit 2 to perform indirect care tasks. Unit 1 has personnel unavailable for care 14.2% of the time compared to 11.7% for Unit 2.

As shown in Table 49, providers on Unit 1 spent an average of 1.47 of each six observations for each hour in direct care versus Unit 2 where 1.18 of the six observations for each hour were spent in direct care. The t value of 1.9617 with 331 degrees of freedom allows the null hypothesis that there is no significant difference between the amount of direct care provided by Unit 1 and Unit 2 to be rejected.

Unit 1 spent 3.2516 of every six observations per provider per hour in indirect care tasks versus the 3.7742 spent by Unit 2. The t value of 3.0315 with 339 degrees of freedom allows the null hypothesis that there was no significant difference between the amount of indirect care between Unit 1 and Unit 2 to be rejected.

The unavailable for care category for Unit 1 was compared to the corresponding data for Unit 2. The t value of .8710, with 339 degrees of freedom was

COMPARISON BETWEEN THE TWO UNITS: DIRECT CARE		
	GROUP 1	GROUP 2
MEAN =	1.4774	1.1828
STD. DEV. =	1.4520	1.3189
N =	155	186
CASES =	1 TO 155	156 TO 341
DIFFERENCE = .2946		
STD. ERROR OF DIFFERENCE = .1502		
T = 1.9617 (D.F. = 339)		
VARIABLE TESTED: DIRECT		
PROB. = .0253		

Table 49

COMPARISON BETWEEN TWO UNITS: INDIRECT		
	GROUP 1	GROUP 2
MEAN =	3.2516	3.7742
STD. DEV. =	1.5774	1.5914
N =	155	186
CASES =	1 TO 155	156 TO 341
DIFFERENCE = -.5226		
STD. ERROR OF DIFFERENCE = .1724		
T = -3.0315 (D.F. = 339)		
VARIABLE TESTED: INDIR		
PROB. = 1.310E-03		

Table 50

not significant and did not allow the null hypothesis to be rejected.

The differences between the acuity on Unit 1 and Unit 2 were compared to determine if there was a significant difference using a t-test. The average acuity across all staff for Unit 1 was 3.56 compared to 3.52 for Unit 2. A nonsignificant value for $t = .1346$ ($df=339$) did not allow rejection of the null hypothesis: The acuity for Unit 1 is not significantly different than the acuity for Unit 2.

The temporal categories were analyzed to determine if there were any individual categories that contributed to the significance found in the direct care and indirect care differences. The results of the tests shown at the inset allow rejection of only one of the hypotheses of difference: wait time.

COMPARISON OF ACUITY ACROSS ALL STAFF:
UNIT 1 TO UNIT 2

	GROUP 1	GROUP 2
MEAN =	3.5676	3.5269
STD. DEV. =	2.7122	2.8402
N =	155	186
CASES =	1 TO 155	156 TO 341

DIFFERENCE =	.0407
STD. ERROR OF DIFFERENCE =	.3026

T = .1346 (D.F. = 339)
VARIABLE TESTED: TOTACUIT
PROB. = .4465

Table 51

DIFFERENCES BETWEEN THE TWO UNITS

	Group 1	Group 2	t(339)	Significant Difference
Clerical	1.0839	1.2043	.9080	No
Prep	.6323	.5968	.3839	No
Conference	.4065	.4247	.2131	No
Wait	.3290	.5269	1.9855	Yes
Personal	.5097	.6454	1.1625	No

Table 52

Three different personnel categories were compared to determine if there was a significant difference in the representation of these categories between the units.

As shown in Table 53, Agency nurses comprised 15% of the staff on Unit 1 and 16% of the staff on Unit 2. Registered nurses, which includes civilians, military, and agency nurses, constituted 54% of the Unit 1 staff and 51% of the Unit 2 staff. Paraprofessional staff were 30% of the Unit 1 staffing and 33% of the staffing on Unit 2. The differences between Unit 1 and Unit 2 was not significant for any of the categories of personnel.

DIFFERENCES BETWEEN THE TWO UNITS				
	Group 1	Group 2	t(339)	Significant Difference
Agency	.1505	.1622	.3008	No
Reg Nurse	.5419	.5108	.5727	No
Para	.3032	.3333	.5922	No

Table 53

STAFFING

Use of the Workload Management System for Nursing for Staffing

The number of patients in each acuity category and the shift when the data has been collected was used to determine the staffing level and mix that would have been required by the Nursing Workload Management System (Tables at Appendix E). This was compared to the actual staffing that had been present during the data collection effort.

The night shift had a 17.5% shortage of registered nurses on

Unit 1 and a 30.6% shortage on Unit 2.

There was a 26.5% shortage of registered nurses on the night shift for the total sample. The opposite effect is found for the paraprofessional staff. There were 52% more LPN's and 91C's than

authorized by the WMSN on Unit 1 and 36% more on Unit 2. Overall there were 40.6% more LPNs and 91C's than required by the WMSN on the night shift. This is consistent with the correlation matrix that indicated there was a positive relationship between shift and the licensed practical nurse category, (LPN), specifically civilian licensed practical nurses.

Of the night shifts sampled, 10% had at least the number of registered nurses authorized by the WMSN, with 90% having less. There were more licensed practical nurses than authorized on 90% of the night shifts sampled.

The dayshift showed a much different picture. There were 52.2% more registered nurses than were authorized by the Workload Management System for Nursing during the day shift for Unit 1, 26.9% more for Unit 2 and an average of 38.8% more than were authorized on the day shift.

NIGHT SHIFT		
	Registered Nurses	Paraprofessional
Unit 1	-17.5%	+52.0%
Unit 2	-30.6%	+36.0%
TOTAL	-26.5%	+40.6%

Table 53

DAY SHIFT		
	Registered Nurses	Paraprofessional
Unit 1	+52.2%	EVEN
Unit 2	+26.9%	+38.5%
TOTAL	+38.8%	+20.0%

Table 54

Every day shift in the sample exceeded the number of registered nurses authorized by the WMSN.

There were the same number of paraprofessional staff on Unit 1 as were authorized by the WMSN when averaged over all of the day shifts. Twenty percent of the shifts had the number of paraprofessional staff authorized, forty percent of the shifts had one additional paraprofessional and forty percent were authorized one additional paraprofessional. Unit 2 had 38.5% more paraprofessional staff than were authorized. On every day shift for this unit there was one more paraprofessional than was authorized. For the total sample there were 20% more paraprofessional than authorized by the WMSN.

The evening shift had 11.22% more registered nurses than were authorized. Unit 1 had 6.7% more registered nurses than authorized and Unit 2 had 15.9%. Paraprofessional staff were 152.4% of the WMSN authorization. Unit 1 showed 53.5% more than were authorized and Unit 2 had 51.5% more than authorized.

EVENING SHIFT		
	Registered Nurses	Paraprofessional
Unit 1	+6.7%	+53.5%
Unit 2	+15.9%	+51.5%
TOTAL	+11.2%	+52.4%

Table 55

If the total authorizations were summed and compared to the total staffing, there were 5.8% more registered nurses than authorized; however if the units are reviewed separately, Unit 1 has 14.4% more than were authorized and Unit 2 has almost 1% less than authorized. If the same

TOTAL SAMPLE		
	Registered Nurses	Paraprofessional
Unit 1	+14.4%	+36.2%
Unit 2	-.8%	+40.8%
TOTAL	+5.8%	+38.8%

Table 56

analysis were performed for the paraprofessional staff, there were 38.8% more than were authorized. Unit 1 was 36.2% above the authorization and Unit 2 was 40.8% above the authorization.

Composite of Current Staffing-Registered Nurses

To determine how much staff is currently utilized, a picture of the average staffing on the two units was constructed. The average shift has .31 head nurse. This is reasonable since there is only one head nurse per unit and head nurses only work on the

day shift. There were 1.57 military registered nurses on each shift. The lowest number on any of the sampled shifts was zero and the highest number of military registered nurses on any of the sampled shifts was three. There were 1.48 civilian registered nurses on each shift, with a low of zero and a high of 3. There were 1.64 registered nurses from agencies on each shift, a low of zero and a high of four. This was the highest average of any group. There was an average of .19 Reservists on each shift, although Reservists were only assigned to day shift.

Average Registered
Nurses per Shift

Headnurse	.31
Military	1.57
Civilian	1.48
Agency	1.64
Reserve	.19

Table 57

The total number of registered nurses was calculated and divided by the number of shifts to find the average number of registered nurses present per shift. The head nurse was included in the first set of computations as a necessary part of the baseline staffing for each unit and because if there was a shortage of other nurses, the headnurse took responsibility for a patient. Because the argument can be made that the headnurse should be in an administrative and supervisory role, the average number of registered nurses per shift was also computed without the headnurse. Nurses who were assigned to the ward for their two week reserve duty were not included to insure that the figures derived were the most conservative possible. The average number of registered nurses per shift was 4.99, including the headnurse, and without the headnurse was 4.69.

Registered Nurse to Patient Ratio

On each shift there is the practice of assigning each patient or several patients to a nurse. This does not imply that the necessary practice of nurses assisting each other with a difficult procedure or when there was a new admission was precluded. The average number of patients that were assigned to the registered nurses during each of the observed shifts was 4.83. The number of registered nurses, both including and excluding the headnurse was divided by the number of patients assigned to registered nurses to determine the registered nurse to patient ratio. The ratio when the headnurse was included was 1.13 registered nurses to patients. This can also be stated: there were 1.13 registered nurses to each patient assigned to a registered nurse for care. Without the headnurse, the ratio is .98 or, for every registered nurse there were .98 patients assigned to headnurses for care. The average number of patients was 8.38. Since there must be RN presence and supervision for every patient, the RN to total patient ratio was also computed, again, including and excluding the headnurse. It is shown in the inset as .58 and .56 respectively.

	Including Headnurse	Excluding Headnurse
Average RN per shift	4.99	4.69
Average Number of RN patients	4.83	Same
RN to RN Patient Ratio	1.13	.98
RN to Total Patient Ratio	.58	.56

Table 58

Composite of Current Staffing - Paraprofessional Staff

The same analysis was completed for the paraprofessional staff. Wardmaster presence was found on .35 of the shifts. There was an average of 1.46 military practical nurse specialists, 91C's, on each shift, a low of zero and a high of four. Civilian licensed practical nurses had an average of 1.35 for each shift.

Average Paraprofessional Per Shift	
Wardmaster	.35
Military LPN	1.46
Civilian LPN	1.35

Wardmaster	.35
Military LPN	1.46
Civilian LPN	1.35

Table 59

Paraprofessional to Patient Ratio

The average number of paraprofessional nurses for each shift was 3.16, if the wardmaster is included, and, 2.81 if the wardmaster is excluded, with a low of one and a high of four. The average total number of patients assigned to the paraprofessional nurses during a shift was 3.54, with a low of 1.4 and a high of 7.

	Including Wardmaster	Excluding Wardmaster
Average Para-professionals per Shift	3.16	2.81
Average Number of Para Patients	3.54	Same
Para to Para Patient Ratio	1.04	.89
Para to Total Patient Ratio	.38	.34

Average Para-professionals per Shift	3.16	2.81
Average Number of Para Patients	3.54	Same
Para to Para Patient Ratio	1.04	.89
Para to Total Patient Ratio	.38	.34

Table 60

The average number of paraprofessional nurses to patients assigned to paraprofessionals was 1.04. This can be restated, as: for every 1.04 paraprofessionals, there was one patient assigned to a paraprofessional. The average number of

paraprofessional nurses per patient was .38.

Composite of Current Staffing - Administrative

The number of administrative staff present were calculated and are shown in the inset: there was .31 headnurse present for each shift and .35 headmaster as previously stated. There was also .55 wardclerk and .12 volunteer. This is an average of 1.33 people per shift who are administrative overhead.

Administrative Overhead	
Average	1.33
Headnurse	.31
Wardmaster	.35
Wardclerk	.55
Volunteer	.12

Table 61

Comparison of Staffing: Unit 1 to Unit 2

The average shift had 9.01 staff members present, not including students who were present for training, but including time served by Reservists. The fewest staff members present was 5 and the most was 11. There was a wide disparity in the number of staff present and the shift.

When the two units are looked at individually and compared to one another, the average total staff present for Unit 1, the 8 bed unit was 8.03 and the average total staff present for Unit 2, the 10 bed unit was 10. The average administrative overhead was 1.13 and 1.52 respectively. The average number of registered nurses, not including the headnurse, present on Unit 1 was 4.41 compared to 4.97. The average paraprofessional on Unit 1 was 2.36 compared to the average paraprofessional for Unit 2 was 3.36

However Unit 1 has an average patient census of 7.75 compared to 9 for Unit 2. The significance of this difference can best be determined if it is compared in terms of differences in the staff to patient ratios as shown below.

The daily registered nurse to total patient ratio for Unit 1 was compared to the daily registered nurse to total patient ratio for Unit 2. The results of this comparison were $t = .0388$, with 30 degrees of freedom, which is nonsignificant. Therefore the null hypothesis that there was no significant difference between the two units could not be rejected.

The null hypothesis that the ratio of number of registered nurses to the number of patients being cared for by registered nurses on Unit 1 was the same as on Unit 2 could also not be rejected since $t = .5182$ with 30 degrees of freedom.

REGISTERED NURSE:TOTAL PATIENTS

	GROUP 1	GROUP 2
MEAN =	.5608	.5581
STD. DEV. =	.1743	.2163
N =	16	16
CASES =	1 TO 16	17 TO 32

DIFFERENCE =	.0027
STD. ERROR OF DIFFERENCE =	.0695

T = .0388 (D.F. = 30) VARIABLE TESTED:
RN/TPAT PROB. = .4846

REGISTERED NURSES:PATIENTS CARED FOR BY
REGISTERED NURSES

	GROUP 1	GROUP 2
MEAN =	.9551	.9971
STD. DEV. =	.1889	.2641
N =	16	16
CASES =	1 TO 16	17 TO 32

DIFFERENCE =	-.0421
STD. ERROR OF DIFFERENCE =	.0812

T = -.5182 (D.F. = 30) VARIABLE TESTED:
RN/ENPAT PROB. = .3041

Table 62

The daily LPN to patient ratio for total patients and for patients cared for by LPN was compared to the daily LPN to patient ratio for Unit 2 using t-tests. The null hypothesis that the ratio of the number of licensed practical nurses to the total number of patients on Unit 1 was the same as on Unit 2 could not be rejected. The null hypothesis that the ratio of the number of licensed practical nurses to the number of patients being cared for by licensed practical nurses on Unit 1 was the same as on Unit 2 could also not be rejected.

PARAPROFESSIONAL NURSE:TOTAL PATIENT

	GROUP 1	GROUP 2
MEAN =	.3139	.3632
STD. DEV. =	.1124	.1141
N =	16	16
CASES =	1 TO 16	17 TO 32

DIFFERENCE =	-.0493
STD. ERROR OF DIFFERENCE =	.0401

T = -1.2316 (D.F. = 30)
 VARIABLE TESTED: LPN/TPAT
 PROB. = .1138

PARAPROFESSIONAL NURSE:PATIENTS ASSIGNED TO PARA

	GROUP 1	GROUP 2
MEAN =	.7817	.9980
STD. DEV. =	.2438	.5735
N =	16	16
CASES =	1 TO 16	17 TO 32

DIFFERENCE =	-.2063
STD. ERROR OF DIFFERENCE =	.1558

T = -1.3373 (D.F. = 30)
 VARIABLE TESTED: LPN/LPAT
 PROB. = .0956

Table 63

ANALYSIS OF AVAILABLE COMPUTER SYSTEMS

One of the first reactions to any perceived personnel shortage is to determine what functions currently performed manually can be automated. To this end, the Physiological Assessment Information Support System (PHAISS) installed on eight intensive care units at Brooke Army Medical Center, was analyzed. Three to four million dollars have been expended to buy the hardware and have the software and firmware developed. The hardware system was installed and the capability for patient monitoring is operational to the extent that it displays the physiological status of the patient at the patient's bedside. This provides more accurate bedside monitoring than was previously available as well as the automatic collection of vital signs. To utilize other functions available in the system requires that demographic information concerning the patient be registered into the system. If this is done, there is the capability of maintaining a record of the patient's care. The drugs that have been prescribed for him, their dosage, when they are to be administered, and the route of entry can be recorded. The drug dose calculations can be performed by the system. The lab tests that have been ordered and the results of those tests can be entered. None of this functionality is being utilized, on seven of the eight units.

On one of the units, a senior non-commissioned officer, is utilizing the output of the system to support the research

protocols currently in use. However the system is not being used to support documentation of the care process. Therefore, the system has been installed, but not implemented.

As the system exists, there is not enough of a perceived benefit to induce the nursing staff to utilize the capabilities of the system that are available. Because many of the automated systems proliferated to military hospitals, have provided no direct benefit to the nursing staff, but have required data entry by nurses, this perception is difficult to overcome.

This is not the only automation available. There is a personal computer located on each of the wards and units for the purpose of completing the acuity worksheet for the Workload Management System for Nursing that is currently used less than one hour daily, if at all.

Patient demographic information is currently entered into the Automated Quality of Care Evaluation Support System (AQCESS) when each patient is admitted; however, the data from this system is not available on the unit.

The demographic information and portions of the patient history are entered in the Triage System in the Emergency Room if the patient is admitted through this point of entry.

The demographic information and a record of visits is entered in the Patient Appointing System if the patient is admitted as a result of an outpatient visit.

The discharge summary is typed on one of the word processing

systems used for that purpose. The hardcopy of this document is reviewed by the coders to assign applicable diagnostic code. This is entered back into the AQCESS.

At the end of each month, the number of outpatient visits from the patient appointment system and the number of inpatient visits from the AQCESS are totaled with the help of a personal computer. The outpatient data is entered manually, but the inpatient data is transported magnetically. This is done so that one tape can be sent to the responsitory where there data is maintained for the MED302 system. Hardcopies of this data are reentered into another system, Uniform Chart of Accounts, that keeps track of workload. The hours that were worked are kept on a worksheet by each of the employees at the hospital and at the end of the month forwarded to a central office. One full time equivalent is required to enter this into a computer so that it can be forwarded for consolidation in the Military Expense Personnel Management (MEPM) system.

The Reaganstreefe laboratory system is being implemented within the laboratory. The next phase of implementation will be result reporting back to the unit, but the integration of this capability with any of the other systems has not been developed.

In summary, there is currently no automated system in place to support the patient documentation process, although there is the potential to put such a system in place if the resources were dedicated to implementation.

CHAPTER 3: CONCLUSION

Review of Hypotheses

There is no significance in the difference between the percentage of direct, indirect, and time unavailable for care between the Misener data for critical care at BAMC and the current study. This is in spite of the differences in nursing since the Misener data was collected. There has been an increase in the use of physiological monitors that measure changes in the patient's status; however, changes in the treatment protocols and new treatments that were not available may have balanced the time savings.

SUMMARY OF HYPOTHESES TOTAL SAMPLE COMPARISON TO MISENER		
	ACCEPT NULL (NS dif)	REJECT NULL (S dif)
Total Sample		
Direct, Ind, Unav	X	
Indirect		X
Unavailable		X
Slack	X	

Table 65

Indirect Care Time

There are significant differences between the percentage for the temporal categories of indirect care between the Misener data for BAMC critical care and the current study.

Clerical

The temporal component that showed the most change was the increase in time attributable to clerical, or charting time. Since the Misener study was completed in 1983 there have been many additions to the requirements for documentation in the patient records. The implementation of quality assurance is one example of this change. Another example is the requirement to

chart the results of batteries of laboratory tests that weren't previously available. The increased use of physiological monitoring may have also increased clerical time because the output is not integrated into the documentation process. The tapes produced by these systems are painstakingly taped into the charts; however, because the laboratory and pharmacy are not connected to these systems, graphs now must be drawn to trend this data. This provides information that may have not been available at the time the Misener study was conducted, but because the management engineering and the interfaces that are required are not in-place, may have contributed to the increase in time spent charting.

A random sample of medical records reviewed to determine what forms were being used to record patient information, showed that there was a considerable amount of duplication in the medical record. Both the admitting physician and the nurse complete a patient history, with many of the same data elements. The patient's demographic information is collected by Patient Administration during the admission process; however, elements of the patient's demographic information are sprinkled throughout the patient record. Additionally, whenever a patient is referred to another service for consultation, the history process is repeated. The costs associated with storing and retrieving this data, as well as the cost of collecting it, drains the medical center of resources that could be utilized elsewhere.

To illustrate the mass of forms that are currently utilized, an admission packet was obtained from each of the units. The forms included in the packet are shown in Table 66. Each form was reviewed to determine what regulation required this form to be used. Army regulation 40-407 governs the use of DA Form 3888 and DA Form 4677. However, a review of this regulation entitled: *Nursing Records and Reports* shows that it is the regulation dictating the use of the majority of the forms shown in Table 66 and others that were not in the admission packet: DA Form 4256, Doctors Orders; DA Form 3888 and 3888-1, Nursing Assessment and Care Plan; DA Form 4677, Therapeutic Documentation Care Plan (Non-Medications); DA Form 4678, Therapeutic Documentation Care Plan (Medication); SF 510, Clinical Record - Nursing Notes (SF 510); Clinical Record-Temperature-Pulse-Respiration; DD Form 792, Twenty-Four Hour Patient Intake and Output Worksheet and many

FORMS IN THE ADMISSION PACKET

DA Form 3888	Medical Record Nursing Assessment and Care Plan
DA Form 3888-1 BAMC OP 493	Medical Record Nursing Assessment and Care Plan (Continued)
DA Form 4677	Therapeutic Documentation Care Plan (Non-Medication)
DA Form 4677 BAMC OP *	Therapeutic Documentation Care Plan (Non-Medication)
DA Form 4677 BAMC OP **	Therapeutic Documentation Care Plan (Non-Medication)
DA Form 4678	Therapeutic Documentation Care Plan (Medications)
DA Form 4700 BAMC OP 11	Master Problem List
DA Form 4700 BAMC OP 256	Vital Signs and Nurses Notes Flowsheet
DA Form 4700 BAMC OP 634	Pressure Sore Risk Evaluation
DA Form 5445-R	Patient Acuity Worksheet
DD Form 792	Twenty-Four Hour Patient Intake and Output Worksheet
SF 510	Nursing Notes
SF 511	Vital Signs Record

Table 66

more. Army regulation 40-400 is cited as the governing regulation for DA Form 4700. This regulation entitled *Medical Services, Patient Administration* was reviewed. The regulation "covers the collection and reporting of inpatient and outpatient biostatistical data, such as the prevalence of selected diseases and the hospital workload." The forms discussed in this regulation are those related to the reporting of admissions and dispositions of patients and with counting workload. This regulation is not concerned with the moment by moment record of the patient's hospital stay. Army Regulation 40-66 *Medical Services, Medical Record and Quality Assurance Administration* is a more germane reference for determining what forms are required to document patient care and is the third reference found in the group of forms. The regulation provides four lists of forms that are authorized for use, but does not compel the use of any. Instead the regulation tries to prevent the adoption of additional forms by restricting the use of local overprinting. This is controlled by requiring exceptions to the policy to be submitted and approved. In those cases "when none of the forms listed in the tables nor a request for exception will provide a needed form, a proposed form may be submitted for approval. The new form will be prepared on DA Form 4700." (1983, Page 24, 7-2b).

Governing and regulatory agencies have contributed to the growth of the number of forms. Each new plan or program requires that some specific data be collected and reported. To facilitate

this, the response is usually to implement a new form. However, the time has come to review all of the forms in use and develop an integrated approach to medical documentation.

Many hospitals are confronting this phenomena. The Chief Nurse (Norton, 1989) at McKenna Community Hospital in New Braunfels, Texas has organized a task force that is systematically reviewing all of the documentation that is required in the patient record. All of the forms previously required to document the patient care on the intensive care unit have been reduced to two forms. The first is the Patient Card Cardex (Appendix F). This includes basic admission criteria such as: origin of the admission, language, mode of arrival, allergies, smoking and drinking practices, assistive devices (glasses, hearing aid, dentures). There is a section of the form used for nursing diagnoses and measurable outcomes. Another section of the form lists the discharge plans and needs of the patient and has a section where resolution of each need is indicated. The form also has a history section. There is a section for instructions to the patient and family and one dedicated to the valuables inventory with a release of responsibility for any valuables the patient does not surrender. There is a section to list the medications that are taken when the patient is not in the hospital. The final section of the form allows the nurse to indicate on the illustration of a person the location of any lesions or scars.

The second form used by this hospital is a six page fold out

24 hour critical care record (Appendix G). There is a section to record the intake and output. The next section on the form records the neurological signs. When the form is folded out the left side has a section to record infusion, skin, cardiovasculae, pulmonary, and gastrointestinal information. The right side has enough space for 24 hours worth of nursing notes. When the form is closed, the right side has a section for laboratory reports and physiological monitoring values. There is a diet section and a cardiac rhythm section. There is a section where the cares and activities are scheduled and recorded. There is also a place for signatures.

The forms management philosophy of this hospital is also of interest when trying to focus on new methods of reducing the overhead required. All forms are printed at the hospital on the hospital's equipment which is not ornate or complicated. Large stocks of forms are not kept on hand. If a new form is required, all of the forms it will replace, and that is the philosophy, are used until the trial period is over and then cut up and used as scratch pads. There is a program to reduce 10% of the forms in use each year. Although it may seem that this type of program would not be applicable to a government hospital, an analysis of the forms in use indicates that there are similarities. Many of the forms in use at BAMC are overprints of standard forms that have been modified in some way to provide a standard method of entering data. Although these forms may provide some new element of information, data that has all ready been entered in the

records must be reentered on this form so that all of the information required to make a decision based on this form is available. If there was only one form with all the information, none of it would be duplicate.

In the sample of medical records there were occurrences where all the blocks on a form were not completed. This missing information was often available on another form in the patient record. Perhaps the block was blank because the information was all ready available. However, the possibility exists that someone in a hurry could interpret that information as being unavailable. For example--allergies--appears on several of the forms. Incomplete medical documentation may have been cited in lawsuits due to the poor integration of the forms in use.

Preparation of Supplies and Equipment

The other category of indirect care that exhibited a substantial increase was time spent in the preparation of supplies and equipment. One factor contributing to this is probably an increase in the amount of equipment in use since the Misener study. More notably may be the method used to manage expendable supplies. Both units used a ward stock system and every available corner was full of supplies. This method of supply came under criticism during the Health Services Management Inspection in 1988. Inspectors found expired items of expendable supplies and drugs on many of the wards and units they inspected. Not only is this method expensive in terms of the cost of inventory, it is expensive in personnel resources. Nurses have

to walk from the patient's bed to the supply area for every item.

The Veteran's Administration has addressed this problem by the use of a cabinet located in each patient's room. The cabinets are restocked by the supply technicians through a locked door located in the hallway. The nurses have a key to the cabinet door located inside the room and take supplies as they are needed.

The use of a cart system has been accepted as saving inventory costs. However, carts have not been implemented at BAMC due to the lack of supply personnel to restock the carts. Another limitation has been the large amount of space required for restocking, but this could be overcome. McKenna Community hospital uses a cart system. The cart is replaced daily, although if the head nurse finds that the supplies have been depleted, another cart may be requested. Although this does not address the problem of the nurses going back and forth to the supply area, once they travel to the supply location, everything is easy to find. This approach also eliminates the need for the unit staff to have to order and restock the supply area.

Communications

The proportion of communications in the indirect category has decreased and contributed to the significant findings. One contributing factor may be the use of facsimile machines to receive laboratory results. Although there was time spent on the telephone obtaining lab results, it may have been less than before the implementation of these machines. Contributing to

this reduction may be the hospitals policy that all laboratory tests from the intensive care units are processed STAT, except those that take longer than one hour to process. Another contributing factor to the reduction of time spent in communications may be the relationship with the pharmacy. Orders may be telefaxed to the pharmacy and a pharmacy technician delivers to the unit.

Administration

There was a significant decrease in the percentage of indirect care time spent in administration, even though the Misener definitions were used to insure that time was correctly attributed to each specific category. Since most of the administrative time was attributable to administrative staff: headnurses, wardmasters, and wardclerks, and these staff members are primarily scheduled on the day shift, the difference in the percentage of the sample collected on each shift may contribute to this explanation. As previously stated, Misener collected 64.7% during the day shift, 22.9% during the evening shift, and 12.5% during the night shift (Misener, Table 3, Page 22), versus 44.9% during the day, 30.3% during the evening and 24.8% during the night shift in the current study. Another factor that may contribute to this may be that it has become acceptable, almost expected, that headnurses take administrative work home to complete. Although this may have contributed to the change there is no method of determining if this behavior has changed since the Misener study was completed.

Travel

The final category of indirect care that showed at least a 5% change was the decrease in travel time from 14% to 4% of indirect care time. The primary uses of this time was moving about the unit and travel time taking samples to the lab.

Unavailable For Care

There are significant differences in the percentages of the components of unavailable for care time between the BAMC critical care data in the Misener study and the current study. There has been an increase in the personal time component from 51% to 82% of time unavailable for care and a decrease from 49% to 18% for offunit time.

Slack Time

Because there was an indication that there may be the potential for reallocation of indirect resources, a category not in the Misener study, was created by adding together the two temporal activities that were discretionary: wait time and personal time. The hypothesis: there is no significant difference in the percentage of slack time between the data for BAMC critical care in the Misener study and the current study could not be rejected. However with 18.4% of the total time in this category, consideration should be given to reapplying a portion of it back to the support of direct care. It is unreasonable to expect that no time is required for personal activities and that no time will be spent waiting; however, the cost of personnel resources are so high that a range of the

percentage of time utilized by these activities be defined. For example if this is approached conservatively so that only the wait time is reapplied, there is the potential to provide care to 8.7% additional patients. To quantify this, an increase of 8.7% would almost allow the 10-bed unit to increase its capacity by one patient, since each patient would now only require 91.3% of the current time.

However, this is an emotional issue with nurses. Anecdotely, some nurses express the feeling that they can't properly care for the patients they have currently have responsibility for. Every nurse that this was discussed with had at least one example of watching a patient go sour and not having the personnel resources necessary to feel as if the situation was being managed.

Headnurses

There is a significant difference for headnurses in the percentage of time attributable to direct care, indirect care, and time unavailable for care between the Misener data, the Misener data for BAMC and the data for the current study. This is demonstrated by the 10% decrease in direct care since the Misener study and a 21% decrease from the Misener data attributable to BAMC. The current 5% spent in direct care

SUMMARY OF HYPOTHESES HEADNURSES COMPARISON TO MISENER

	ACCEPT NULL (NS dif)	REJECT NULL (S dif)
Direct, Ind, Unav		X
Indirect		X
Unavailable		X
Slack	X	

Table 67

indicates that while headnurses may assist with a patient, they are not primarily responsible for providing direct patient care. The large decreases since the Misener study may indicate that there has been a change in the role of the headnurse. Indirect care time was relatively stable. Unavailable for care time increased to 29% from 17% in the total Misener study, and 11% in that portion attributable to BAMC. The decrease in direct care corresponds to the increase in the unavailable for care category.

Percentage of the temporal categories of indirect care for headnurses in the current study are significantly different than the percentage of the temporal categories of indirect care time for headnurses in the Misener study or in that portion of the Misener data attributable to BAMC. The percent of indirect care is, as stated, relatively stable, however, the distribution within that category has changed. The most significant change was the increase in the preparation of supplies and equipment category from 5% in the Misener study for both the total data and for the data attributable to BAMC to 21% of the indirect care time. A portion of this increase could be attributable to the increase in equipment since the time the Misener study was conducted. There is a decrease in clerical time which is most likely related to the decrease in direct care time, since clerical time is directly related to patient care.

The hypothesis: percentage of time unavailable for care for headnurses in the Misener study for the data attributable to BAMC is not significantly different than the percentage of time

unavailable for care for headnurses in the current study, can be rejected. There has been a decrease in the amount of personal time from 6.4% to a low 1.7%. Offunit time, however, has increased from 5% to 28.8%. There should be some contributing factor to explain this change, but since this is offunit time it was not measurable.

The hypothesis: percentage of slack time for headnurses in the data attributable to BAMC in the Misener study is not significantly different than slack time for headnurses in the current study cannot be rejected. Headnurses have a low percentage of slack time in the current study, down from 7.4% to 3.4%. There is not an abundance of opportunity to reapply time from this category.

Wardmasters

There is no significant difference in the percentage of time attributable to direct care, indirect care, and time unavailable for care for wardmasters between the Misener data, the Misener data for BAMC and the data for the current study.

Wardmasters in the current study had only 6% in direct care time. This indicates that wardmasters are not primarily direct care providers, but rather administrative personnel. There was a decrease in time unavailable for care

SUMMARY OF HYPOTHESES WARDMASTERS COMPARISON TO MISENER		
	ACCEPT NULL (NS dif)	REJECT NULL (S dif)
Direct, Ind, Unav	X	
Indirect		X
Unavailable	X	
Slack		X

Table 68

The hypothesis: percentage of slack time for wardmasters in the data attributable to BAMC in the Misener study is not significantly different than slack time for wardmasters in the current study can be rejected. The amount of slack time has more than doubled since the Misener study. Although personal time has remained stable, time spent waiting has risen from less than one percent to almost 11% of the total time available for a total amount of slack time of almost 19%. This is especially significant when one considers that there is no counterpart for this role in civilian or Veteran's Administration hospitals. The headnurse manages all personnel, professional and paraprofessional. Housekeeping performs the environmental tasks. Supply technicians and maintenance personnel perform the preparation of supply and equipment roles. This is not to suggest that this individual be removed from the system. However, to have an individual this senior, with this much experience spending 18.7% of their time unoccupied and 17% of their indirect time performing environmental tasks seems frivolous.

Wardclerks

There is no significant difference in the percentage of time attributable to direct care, indirect care, and time unavailable for care for wardclerks between the Misener data, the Misener data for BAMC and the data for the current study. The time that had been previously spent in direct care and the slight decrease in indirect care has been reallocated to time unavailable for

care.

The hypothesis: percentage of the temporal categories of indirect care for wardclerks in the current study are not significantly different than the percentage of the temporal categories of indirect care time for wardclerks in the Misener study or in that portion of the Misener data attributable to BAMC may be rejected.

The change in clerical time from 34% in the total Misener data to 15% in the BAMC data to 54% in the current study may indicate a fine tuning of the role of the wardclerk to support the increased patient record documentation requirements. Wardclerks, as with headnurses and wardmasters showed a decrease in administrative time. The difference is quite marked with 30% shown in the Misener study, 57% shown in the Misener data attributable to BAMC, yet a drop to 12% in the current study. Time spent in communicative activities stayed the same, yet it dropped for every other category of provider. One possible explanation is that while the other provider categories are receiving more of their information needs through the facsimile machine, wardclerks are assisting in acquiring information that is needed more quickly or that takes time to gather.

The hypothesis: percentage of time unavailable for care for wardclerks in the Misener study for the data attributable to BAMC

SUMMARY OF HYPOTHESES
WARDCLERKS
COMPARISON TO MISENER

	ACCEPT NULL (NS dif)	REJECT NULL (S dif)
Direct, Ind, Unav	X	
Indirect		X
Unavailable	X	
Slack	X	

Table 70

is not significantly different than the percentage of time unavailable for care for wardclerks in the current study cannot be rejected. Almost one third of the wardclerk's time (28.3%) is spent in this category; one third in offunit time and two thirds in personal time. Offunit time is primarily consumed taking specimens to the lab.

The hypothesis: percentage of slack time for wardclerks in the data attributable to BAMC in the Misener study is not significantly different than slack time for wardclerks in the current study cannot be rejected. Of the two components in this category, only personal time showed a change (from 12.4% to 18.9%). Wait time, as for headnurses, was very low at 2.8%. The revelation that wardclerks spend more than 20% of their time in unproductive activity warrants some examination of the activities they are assigned.

Registered Nurses

There is no significant difference in the percentage of time attributable to direct care, indirect care, and time unavailable for care for registered nurses between the Misener data, the Misener data for BAMC and the data for the current study. There is almost no difference in the percentages of time allocated to each category. Registered nurses

SUMMARY OF HYPOTHESES REGISTERED NURSES COMPARISON TO MISENER		
	ACCEPT NULL (NS dif)	REJECT NULL (S dif)
Direct, Ind, Unav	X	
Indirect	X	
Unavailable	X	
Slack	X	

Table 71

still spend about 29% of their time in direct care, 61% in indirect care and 10% unavailable for care. To state this another way, for every minute spent in direct care, there are two minutes spent in indirect care and for every minute unavailable there are three minutes of direct care and six minutes of indirect care.

The hypothesis: percentage of the temporal categories of indirect care for registered nurses in the current study are not significantly different than the percentage of the temporal categories of indirect care time for registered nurses in the Misener study or in that portion of the Misener data attributable to BAMC may be rejected. Registered nurses in the current study spent more time in clerical activities than in any of the other indirect care activities. This has increased by 8% from the total data in the Misener study and by 11% for that portion of the data attributed to BAMC. Preparation of supplies and equipment consumed the second highest portion of indirect care time, up 7% and 6% from the Misener data and the Misener data attributable to BAMC respectively. This increase in time spent in preparation of supplies and equipment has been shown to have occurred in both the administrative and provider staff and currently consumes 18% of the indirect care category for registered nurses. Registered nurses spent very little time travelling about the unit, performing administrative functions, or accomplishing environmental tasks --a total of 7% for all three categories.

The hypothesis: percentage of time unavailable for care for registered nurses in the Misener study for the data attributable to BAMC is not significantly different than the percentage of time unavailable for care for registered nurses in the current study cannot be rejected. The 10% of time spent by registered nurses in this category is one part offunit time to four parts personal time. There does not seem to be a large potential for change in this category.

The hypothesis: Percentage of slack time for registered nurses in the data attributable to BAMC in the Misener study is not significantly different than slack time for registered nurses in the current study cannot be rejected. There is currently 20% of the total available time consumed by slack time; 8% in personal time and 12% waiting. This has not changed significantly since the Misener study; however, it represents an opportunity cost.

Civilian Licensed Practical Nurses

There is no significant difference in the percentage of time attributable to direct care, indirect care, and time unavailable for care for civilian licensed practical nurses between the Misener data, the Misener data for BAMC and the data for the current study. Although there is not a significant different in the change from the Misener study, the reduction in the direct care percentage corresponds with the increase in indirect care time and unavailable for care time.

The hypothesis: percentage of the temporal categories of

indirect care for civilian licensed practical nurses in the current study are not significantly different than the percentage of the temporal categories of indirect care time for civilian licensed practical nurses in the Misener study or in that portion of the Misener data attributable to BAMC may be rejected. The largest component of the indirect category was the 41% spent in clerical time. This is almost three times the amount in the Misener study (15%) and more than three times the percentage in the Misener data attributable to BAMC (12%). This is more than any of the providers and more than any category, except wardclerk. This may be attributable to the practice of assigning the least acute patients to licensed practical nurse staff members, but assigning more than one, whereas registered nurses are assigned the most acute patients, but are assigned fewer. The next highest use of indirect care time was the 19% spent in the preparation of supplies and equipment. This was up considerably from the 10% in the Misener study and in the 12% of the Misener data attributable to BAMC. There were corresponding decreases in travel time (from 21% to 8%) and wait time (from 22% to 7%).

The hypothesis: percentage of time unavailable for care for licensed practical nurses in the Misener study for the data

SUMMARY OF HYPOTHESES CIVILIAN LICENSED PRACTICAL NURSES COMPARISON TO MISENER		
	ACCEPT NULL (NS dif)	REJECT NULL (S dif)
Direct, Ind, Unav	X	
Indirect		X
Unavailable		X
Slack		X

Table 72

attributable to BAMC is not significantly different than the percentage of time unavailable for care for licensed practical nurses in the current study is rejected. The 9% increase in this category, from 7% to 16% was attributable to the 10% increase in personal time.

The hypothesis: Percentage of slack time for civilian licensed practical nurses in the data attributable to BAMC in the Misener study is not significantly different than slack time for licensed practical nurses in the current study is rejected. This category of provider was the only category to show a significant decrease in this category. What is interesting to examine is the change that took place. Personal time increased by 10%; however, wait time decreased by 16%, from 20% to 4%. The remaining 20% in this category was still the higher of any provider.

Practical Nurse Specialists, 91C's

There is no significant difference in the percentage of time attributable to direct care, indirect care, and time unavailable for care for practical nurse specialists between the Misener data, the Misener data for BAMC and the data for the current study. In the Misener study this category of personnel had the highest proportion of direct care, at 31%, with an even higher percentage at BAMC with 38%. This has

SUMMARY OF HYPOTHESES LICENSED PRACTICAL NURSE SPECIALISTS COMPARISON TO MISENER		
	ACCEPT NULL (NS dif)	REJECT NULL (S dif)
Direct, Ind, Unav	X	
Indirect		X
Unavailable		X
Slack	X	

Table 73

fallen to 24% which places this category at 5% less direct care than registered nurses. The 66% indirect care time is up from 52% in the Misener study and up even further from the 46% in the Misener data attributable to BAMC takes the 91C from having the lowest percentage of indirect care for the three provider categories to having the highest percentage of indirect care. The 10% in unavailable for care is a drop from 18%, and places the 91C's in first place, tied with registered nurses, for least percentage of indirect care.

The hypothesis: percentage of the temporal categories of indirect care for practical nurse specialists in the current study are not significantly different than the percentage of the temporal categories of indirect care time for practical nurse specialists in the Misener study or in that portion of the Misener data attributable to BAMC may be rejected. Percentage of indirect care time spent in clerical activities led this category. At 33%, this was more than double the 15% in the Misener study, which is consistent with the other categories of providers. The second highest category of indirect care time was time spent preparing supplies and equipment at 21%, up from 14% in the Misener study and the data attributable to BAMC. There was a large decrease in travel time from 23% in the Misener study to 17% in the BAMC data to 5% in the current study.

The hypothesis: percentage of time unavailable for care for practical nurse specialists in the Misener study for the data attributable to BAMC is not significantly different than the

percentage of time unavailable for care for practical nurse specialists in the current study is rejected. This is largely due to the decrease from 16% to 10% in this category, largely due to the decrease in offunit time from 8% to less than one percent.

The hypothesis: Percentage of slack time for practical nurse specialists in the data attributable to BAMC in the Misener study is not significantly different than slack time for practical nurse specialists in the current study may not be rejected. The current 18% of time that is slack is only a 3% increase from the Misener data. This is slightly lower than the percentage of slack time by civilian licensed practical nurses (19%), but higher than the 10% used by registered nurses.

RELATIONSHIPS BETWEEN THE VARIABLES

The next step after the percentages of care time were established was to examine the relationships between the data. The understanding of these relationships is key if a change in the percentages is to take place.

The variable of most interest is DIRECT. The positive correlation with the two most acute categories of patients and with the total acuity category supports the acuity coding method being utilized, such that the more acute the patient, the higher the percentage of direct care that is provided. There was a positive relationship with personnel in the registered nurse category, particularly civilian registered nurses and agency nurses. The only unanticipated information revealed in the negative correlation was that the temporal category of indirect

time: preparation of supplies and equipment did not have a significantly negative relationship with the direct care category. All of the other indirect care and unavailable for care temporal categories showed a negative relationship. The administrative categories of personnel all showed a negative relationship with direct care.

The next variable of interest was TOTACUITY, the variable that kept the score for the acuity of the patients being cared for. There was a positive relationship with time spent preparing supplies and equipment and with clerical time. This relationship between the three variables -- direct, total acuity and clerical -- indicates there may be competition between time spent in clerical tasks and time spent in direct care for the most acute patients. There was also a positive relationship with military and civilian registered nurses and civilian licensed practical nurses. Acuity was negatively related to offunit time, time spent in conference, and administrative time.

Another variable of interest to be examined was SHIFT. Since this variable was coded 1=day, 2=evening, and 3=night, a positive correlation related to increased occurrences on later shifts. There is a positive relationship with total acuity due to all new patients carrying the most serious acuity code between the time they are admitted until midday the next day. There is also a positive relationship with the civilian licensed practical nurse category of provider, which indicates a greater presence on later shifts. There was a negative relationship with all

administrative categories of personnel, agency nurses, military 91C students, and reservists. There was a negative relationship with both slack categories, indicating less time utilized as slack time on the later shifts.

VARIABLES THAT PREDICT DIRECT CARE TIME

A regression model that accounted for .8393 of the variability was built with 25 variables. To determine which variables best predicted direct care a stepwise regression was processed and showed that as total acuity increased, direct care increased. The only other significant positive predictor was students in the intensive care course. The negative predictors were all temporal categories. In order of importance they were: clerical, communications, wait, personal, conference, travel, preparation of supplies and equipment, and administration.

COMPARISON OF THE TWO UNITS IN THE CURRENT STUDY

The null hypothesis: Direct care time on Unit 1 is not significantly different than direct care time on Unit 2 was rejected. There was significantly more direct care time per provider on one unit than the other.

The null hypothesis: Indirect care time on Unit 1 is not significantly different than indirect care time on Unit 2 was rejected. Not suprisingly, the unit that showed significantly more direct care time demonstrated less indirect care time.

The null hypothesis: Unavailable for care time on Unit 1 is not significantly different than unavailable for care time on Unit 2 was not rejected.

The null hypothesis: **Acuity on Unit 1 is not significantly different than Unit 2** could not be rejected. Therefore, even though there was a significance in the amount of direct care per provider on one unit, there was not a significant difference in the acuity.

To try to determine what specific categories of care contributed to the significance of indirect care, the temporal categories -- clerical, preparation of supplies and equipment, personal, and time spent in conferences -- were tested and found to be insignificant. The temporal category, wait, was tested and found to be significant allowing the hypothesis: **Wait time on Unit 1 is not significantly different than wait time on Unit 2** to be rejected.

To determine if there was a difference in the relative number of agency nurses, registered nurses, or paraprofessional nurses between the two units. None of the provider categories showed significance; therefore the hypotheses:

Relative Number of Agency Nurses on Unit 1 is not significantly different than relative number of Agency Nurses on Unit 2,

Relative Number of Registered nurses on Unit 1 is not significantly different than relative number of registered nurses on Unit 2, and

Relative Number of Paraprofessional nurses on Unit 1 is not significantly different than Unit 2,

may not be rejected.

STAFFING

It is essential that the yardstick being used to measure how many nurses are needed is validated. The requirement to have a system that determines staffing levels based on patient care requirements was a Joint Commission on Accreditation of Healthcare Organizations mandate that first appeared in the 1984 standard and has been repeated with every update. The 1989 Manual (Joint Commission on Accreditation of Healthcare Organizations 1988, 138) in the chapter on Nursing Services states in standard NR.4.4 "The nursing department/service defines, implements, and maintains a system for determining patient requirements for nursing care on the basis of demonstrated patient needs, appropriate nursing intervention, and priority for care." To satisfy that requirement, the Nursing Workload Management System has been adopted by the Department of Defense as the standard for determining the number of nurses required at each military hospital.

Use of the Workload Management System for Nursing for Staffing

The number of staff on the two units exceed that authorized by the Workload Management System for Nursing. The staffing patterns show that the day shift is staffed at 138.8% for registered nurses and 120% for paraprofessional staff; evening shift is staffed at 111.2% for registered nurses and 152.4% of paraprofessional staff; and night shift is staffed at -26.6% for registered nurses, and 146.1% for paraprofessional staff. Overall there are 105.8% of the registered nurses and 138.8% of

the paraprofessional staff authorized by this system. One of two conclusions can be drawn from this: (1) The Workload Management System for Nursing is not a valid staffing tool or (2) The staffing system is being ignored so that more staff can work on the day shift.

Results of the Implementation of the System

The implementation of this system reduced a change in the number of patients that were able to be cared for in this military tertiary care facility. This caused several phenomena to occur. The first was turbulence in patient referral patterns, brought about by the closure of the medical center to referrals from the medical evacuation system. Patients who were referred from Medical Activities for treatment were not accepted because there was no staffed bed. This impacted especially on patients who would have been referred for long courses of chemotherapy. However, interruption of referral patterns was not the only result of this reduction.

Patients who had previously relied on the local military facility were forced, without notice, onto the civilian community. Because of this many were caught uninsured for that portion which CHAMPUS did not cover. This caused a public outcry and some loss of the good community standing that Brooke Army Medical Center had enjoyed for so many years.

There is also the productivity issue. If, given the same resources as a year before, and two years before, fewer patients are treated, productivity has decreased. This can have future

impacts on the ability of the hospital to continue to provide the current level of service. The resource allocation system that is currently used distributes the resources based upon the previous workload. As workload decreases, resources follow, until a spiral down effect begins.

Not all of the results of the implementation of the system were negative. The long-term patient care roster was carefully reviewed and the number of longterm patients were reduced. The shortage of beds has caused physicians to carefully review each patient's status more frequently which may decrease length of stay. Admissions for diagnostic procedures have been reduced by the adoption of new policies that reduce the acceptable waiting time. The lower census reduces the inpatient to physician ratio which allows more time for each patient and may improve quality of care.

Composite of Current Staffing

To examine how the current staffing compares to the civilian sector, it is necessary to establish the current nurse to patient ratios. In the four hospitals that were visited, the headnurse was also a care provider. Because the headnurse at BAMC is primarily administrative, this will be removed from the nurse to patient ratio. There was also no wardmaster role in the four hospitals that were visited, so this also will be removed. The wardclerk role was performed differently at each hospital. The Veterans Administration had one wardclerk for every two intensive care units. Methodist allowed the headnurse to determine how

that position would be used. If a nurse could not be hired and the headnurse wanted a wardclerk, the position could be used in that manner. McKenna had a unit coordinator assigned to each intensive care unit that served the role of wardclerk and wardmaster. The three positions: headnurse, wardmaster, and wardclerk, accounted for an average administrative overhead of 1.21 staff members per shift at BAMC. Because there was also a volunteer who performed administrative tasks and accounted for .12 staff member per shift, for a total of 1.33 per shift.

There was an average of 4.69 registered nurses per shift and an average of 2.81 paraprofessionals per shift. The average shift had 9.01 shift members present. The average number of patients being treated was 8.38 for a staff to patient ratio of 9.01 to 8.38 or 1.08 staff members to each patient.

To remove some of the margin for error when comparing averages, the registered nurse to patient ratio was computed by examining the individual nurse to patient assignments. If the headnurse is excluded from this comparison, the nurse to patient ratio is .98 registered nurse for each patient assigned to a registered nurse. The average acuity of the patients assigned to the registered nurses was 4.84. The same analysis was completed for the paraprofessional staff. The average paraprofessional to patient ratio, excluding the wardmaster, is .89, or for every .89 paraprofessional, there is one patient. The average acuity of the patients assigned to the paraprofessional was 5.77. The acuity is higher for the paraprofessional staff due to the

practice of assigning the least acute patients to the paraprofessional staff, but assigning more than one.

The Veteran's Administration hospital in San Antonio (Weinberger, 1989) uses a straight staff to patient ratio to determine the number of registered nurses -- there is an all registered nurse staff -- needed to staff each intensive care unit is what is utilized. Total staff authorized to support the twenty-one shifts per week is two full time equivalent nurses to each patient (average). For the six bed intensive care unit there are thirteen nurses, each working five shifts per week. This is a total capability of 65 shifts divided by the 21 that require coverage. This is an average of three nurses per shift, but the probability is that out of the thirteen nurses, one will be on leave, so there will be at least two and sometimes three nurses per shift. Intensive care beds have never been capped. If there get to be too many patients, a nurse may be pulled from another unit or one of the nurses offered overtime. Conversely, if there are not many patients, one of the nurses may take compensatory time or leave.

The Humana hospital in San Antonio (Jane Austin, 1989) holds each headnurse responsible for productivity. The tool used to make staffing decisions is a "fixed, variable" system. The fixed component is the headnurse. The variable component is the number of nurses. The ratio used is one nurse per two patients per shift. Unlike the Veterans Administration, there are registered nurses, licensed practical nurses, and nurses aides. The

headnurse makes the skill mix decision based upon the acuity of the patients. The staffing mix is decided one shift ahead. To support this flexibility a nursing pool is available to each headnurse. Members of the float pool sign a contract for three weekend shifts per month. If a pool member is unavailable to work for three consecutive pay periods, she is given an exit interview.

McKenna Community Hospital also uses a one nurse to two patient ratio per shift plus the unit administrator to staff the intensive care units. However the patients may not be as acute in this example.

There is a disparity in the staffing standard used by BAMC and the hospitals that were visited. BAMC is primarily using the standard of one nurse to one patient. The four hospitals, even though there four different types were visited: not for profit, for profit, government teaching, and community; utilized the same basic standard of one nurse to two patients. Each of the hospitals had a mechanism in place that responded to the headnurse's judgement that more staff above this standard was needed. Although this is sample size can not be used to reject or accept hypotheses, it is large enough to cause the standard in use to be examined and be the subject of further study.

CONCLUSION

To apply the idea of cost effectiveness to computer systems installed in military hospitals, it is essential to first go back to the goals of the system. One of the first goals is to provide access to care for the eligible population. The military healthcare system has as one of its biggest problems the ability to provide care for the total beneficiary population at the lowest cost. Patients who are turned away from the doors of military hospitals and sent to seek care in the civilian market are usually eligible for care under the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). Under this program the government must pay that portion of the cost, usually 80%, not paid by the patient. It follows, therefore, that efforts to make the military healthcare system more productive would result in the avoidance of CHAMPUS costs. It has been shown in study after study that care can be provided within the military system for less than sending these same patients out on CHAMPUS. The current figure being used is \$1.00 of care in a military hospital costs \$1.41 if the same care is provided by CHAMPUS (Colonel Munley, 1989).

To ensure this number remains on the positive side, it is essential that productivity standards be established. A rational staff to patient ratio, tempered by acuity, must be adopted. To be more productive the documentation of what we do must not be allowed to overwhelm what we do.

The computer systems we install to support this effort, must support the effort and not add to the workload. However, no computer system will be effective unless the management engineering that is needed is undertaken and a staffing standard is agreed upon and utilized.

Recommendations

The eight hour focus of the hospital should be changed to a twenty-four hour focus. Reservists should be utilized on all shifts. Offer an incentive to Agency nurses, if we must use them, to work on other than day shift. Discharge on all shifts. Free beds up on all shifts. For example if a patient expires the nursing time that would have been devoted to that patient is no longer necessary after some terminal care activities. Because there are physically more beds than are staffed, it is possible to admit another patient before the bed is available. Although this may seem offensive this could prevent the death or transfer of another patient who is waiting in the emergency room.

Revise the forms that are currently in use. The primary governing regulation is Army Regulation 40-407. "The proponent agency of this regulation is the Office of the Surgeon General. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to HQDA (DASG-CN), WASH DC 20301." A multi-disciplinary working group should meet to redesign the forms currently in use. A review group, consisting of physicians, nurses, laboratory officers, pharmacists, dietitians, community

health nurses, social workers, physical therapists, occupational therapists, respiratory therapists, medical record specialists, quality assurance specialists, information management specialists, and any other group with input into the documentation process should review the output.

Review the current method of storing and issuing supplies on the intensive care units.

Establish a user's group for integrating the current hospital computer systems. Begin to define a hospital data dictionary, based upon the Composite Health Care System, so that new systems being developed will be easier to integrate into current systems and so evolution to the new system will be less traumatic.

Make a decision about the Workload Management System for Nursing. If it is going to be the system that is used, staff to it; otherwise, make a decision concerning a rationale staffing standard.

Appendix A Definitions

Appendix A: Definitions

BAMC - Brooke Army Medical Center, Fort Sam Houston, Texas.

Benefits Realization Program - A plan for identifying the changes that must be made in the current work environment to derive the greatest benefit from the implementation of a computer system. The technique includes analyzing the workflow of the organization that is receiving the computer system to determine which processes should be modified or replaced. The technique also includes analyzing the capabilities of the computer system.

Direct Patient Care - "Physical or sensory interaction with the patient having a direct bearing on his needs such as: physical care of the patient, assisting doctor with examinations, treatment or procedure; talking with the patient". (Misener, Frelin, and Twist 1983, 13-A)

Indirect Patient Care - "Patient-centered activities performed away from the patient such as: communications, planning his care, assessing his needs, preparation of medications, equipment, team conference, etc." (Misener, Frelin, and Twist 1983, 13-A) For purposes of this study, indirect patient care also includes time not available for care (Category 0).

0. Refers to meal time, coffee, personal telephone calls, socialization not related to work, personal toilet activities.

1. Off unit activities: Refers to activities which remove individual from the ward for less than a full 8 hour shift.

- a. Doctor or Dental Appointment
- b. Mandatory Training
- c. Seminars and Continuing Education Requirements
- d. Duty Roster Performance
- e. Company Duty
- f. Compensatory Time
- g. Leave without pay
- h. Air Evacuation/Ambulance Runs
- i. Staff and Other Administrative Meetings (non-patient conferences)
- j. Educational Advancement Permitted During Duty Time
- k. Absence due to illness of dependent/ taking dependent to medical appointment
- l. Miscellaneous
- m. Orientation
- n. Inprocessing
- o. Outprocessing
- p. Civilian Annual Leave (Does not include regular scheduled day(s) off during week) (Less than 8 hours)
- q. Ill (Sick leave)

2. Communicative Acts - Refers to those communicative acts that are necessary in meeting requirements for patient care. These activities include answering the phone and all communicative acts between personnel.

3. Preparation of Medications, Supplies, and Equipment - Refers to the set-up and tear-down of all patient care supplies, medications, and equipment, and checking of all emergency equipment and supplies.

4. Charting, Chart Reference, and Clerical - Refers to all activities involving the patient's care or written materials concerning the patient to include checking or reading the Kardex, careplan/chart transcription or writing of orders, writing in chart, Kardex, or careplan. All information to include vital signs, intake and output, completing or filing of clinical reports.

5. Conferences - Refers to those meetings or planning sessions which infringe upon direct nursing care time and includes the change of shift report, medical and nursing rounds, patient care conferences, and patient care planning (include written nursing care plan development).

6. Travel and Transportation Tasks - Refers to those activities that utilize nursing personnel in transporting people and objects. These activities include the transporting of patients, transporting of all supplies and equipment, transporting specimens and traveling on the ward.

7. Administrative Tasks - Refers to those activities that are performed in meeting general management needs of the patient care unit. These activities include the time schedule, staff assignments, efficiency reports, chart audit, manpower survey records, and special written reports.

8. Environmental Control Tasks - Refers to those cleaning activities that infringe upon direct nursing care time. These activities include cleaning the patient care unit, linen control, cleaning of ward equipment, mopping and cleaning the floors and emptying the trash.

9. Wait Time - Refers to those time intervals when the individual must wait for supplies, equipment, medical approval or similar actions. Include time staff may appear to be doing nothing, but waiting to render patient care.

Appendix B Rater Instructions

Appendix B: Rater Instructions

INSTRUCTIONS: Work Sampling Data - Ward Personnel Form

This is the form that will be used to collect all data for the Study in which you are participating. You will be asked to complete ONE FORM for EACH HOUR of observation. In order for this study to be valid these forms must be completed precisely. Please follow the instructions carefully:

DATE: Place date in the space provided using DDMMYY as the format. Please use the numerical designation of the month.

DAY OF WEEK: Please enter the numeric code in the space provided (1=Sunday, 2=Monday, 3=Tuesday, ETC)

WARD: Enter the alpha numerical designation of the ward, (example: 12B)

SHIFT: In the space provided enter the code for the Shift (1=Day, 2=Evening, 3=Night)

HOURL OBSERVED: Enter the hour the observation began (example: 0900-1000 observed = 0900)

OBSERVER: Enter your name in the space provided.

The remainder of the form is for actual data collection. In the "Provider" column list each care provider present for duty for the shift. Indicate the provider code in the "Code" column as follows:

1 = Head Nurse	4 = 91C	7 = Aide/NA	0=Volunteer
2 = Wardmaster	5 = LPN	8 = Ward Clerk	
3 = RN	6 = 91B	9 = Student	

Across the form are listed 11 different activity categories broken down into six 10-minute sections. As you make each of the six observations for that hours place a check mark in the appropriate activity column.

(Example: At 20 past the hour the observation is of the 91C talking to the RN about a patient. Place a mark on the provider line marked 91C in the COMMUNICATIVE ACTS column under the "2".)

Appendix C Rater Training

Appendix C Rater Training

INTRODUCTIONS:

Discussion of purpose, objective, roles, uniform requirements and duty schedule.

METHODOLOGY:

- Work sampling technique effective/accurate over time,
- Process, data collection instrument
- Caution against bias, don't anticipate,
- Rotate about ward observe each staff member as approached.
- Randomize start time, place, and direction
- Remove yourself from area/staff between rounds
- Inquire into absence of staff - purpose being business or personal
- Make notations on back with additional information (odd shifts, borrowed help)
- Use operational definitions carefully, refer to list often
- Some arbitrary definitions have been made (ie hand washing is "Prep of Meds")
- Interaction with staff (other than asking for assistance in locating staff members) kept to a minimum
- Answer all questions regarding the study, forms, etc (staff or patients)
- All observations, proceedings on ward are CONFIDENTIAL.
- No participating in care except in an emergency situation (immediate)

DATA COLLECTION

- Discuss coding instructions
- Issue supply of forms for practice, clip boards, name tags, pencils

TESTING & PRACTICE

-After thorough discussion of operation definitions and rationale for specific decision making, administer Test. Review test results and discuss incorrect answers until all agree on definition and rationale used.

-Practice in pairs for remainder of first day of training on a typical ward

-Tour wards to be observed to establish boundaries and lounge area suitable for the observer to use between tours.

-Meeting at beginning of second day to discuss problems/apprehension of the practice session and ask questions. After all comfortable with day one events, retake test.

-Discuss results of test and practice until time for exit briefing

-Trainer rotates among both wards during practice to observe observers and discuss study/questionnaire with RNs on wards to be observed during study.

-Last session at the end of day two to answer all questions, issue supply of forms, exchange contact phone numbers in case of emergency, and final review of instructions.

EXAMPLE OF WRITTEN TEST FOR OBSERVERS

1. ---- WC answering intercom.
2. ---- NA helping X-Ray Technician position patient.
3. ---- NA delivering dinner to patient.
4. ---- LPN helping patient brush teeth.
5. ---- LPN recording fluid intake.
6. ---- RN signing out a narcotic.
7. ---- NA bagging linen.
8. ---- HN off unit for administrative meeting.
9. ---- Two RN's making intershift narcotic count.
10. ---- LPN headed for staff bathroom.
11. ---- HN making staff assignments.
12. ---- WC delivering mail to patients.
13. ---- 91B off unit for head count.
14. ---- RN mixing an I.V. in the medicine room.
15. ---- LPN checking a surgical dressing.
16. ---- RN recording a medication given.
17. ---- LPN helping MD with a thoracentesis.
18. ---- RN showing patient how to administer own
heparin injection.
19. ---- RN and LPN putting a new patient onto a
Stryker frame.
20. ---- LPN helping post-op patient cough and deep
breathe.

Appendix D Correlation Matrix

----- CORRELATION MATRIX -----

HEADER DATA FOR: B:TGJN20 LABEL:
NUMBER OF CASES: 341 NUMBER OF VARIABLES: 53

CORRELATION MATRIX - SELECTED VARIABLES

	SHIFT	HEADNURS	WARDMAST	MILRN	MRNSTU	CIVRN	CIVLPN	MIL91C
SHIFT	1.00000							
HEADNURS	-.14226	1.00000						
WARDMAST	-.11496	-.03152	1.00000					
MILRN	.15861	-.07474	-.07821	1.00000				
MRNSTU	-.08165	-.03706	-.03877	-.09193	1.00000			
CIVRN	.10319	-.07090	-.07419	-.17589	-.08721	1.00000		
CIVLPN	.19702	-.06772	-.07086	-.16800	-.08330	-.15937	1.00000	
MIL91C	.08094	-.07105	-.07435	-.17627	-.08739	-.16721	-.15971	1.00000
AGENCY	-.26429	-.07623	-.07976	-.18911	-.09376	-.17939	-.17135	-.17978
M91STU	-.12339	-.03472	-.03633	-.08613	-.04270	-.08170	-.07804	-.08188
WARDCLK	-.11676	-.04190	-.04384	-.10394	-.05153	-.09860	-.09418	-.09881
VOLUNT	-.10298	-.01885	-.01973	-.04677	-.02319	-.04437	-.04238	-.04447
RESERVE	-.12688	-.02323	-.02431	-.05763	-.02857	-.05467	-.05221	-.05478
BEDNR	.09444	-.12508	-.16071	.09609	-.16597	.15372	.15002	-.05478
ACUITY1	99.99999	99.99999	99.99999	99.99999	99.99999	99.99999	99.99999	99.99999
ACUITY2	-.07282	-.01333	-.01395	-.03307	-.01640	-.03137	-.02997	-.03144
ACUITY3	.07421	-.06622	-.01652	-.02092	.00983	-.05773	.00354	.22283
ACUITY4	.06283	-.00828	-.05120	.02903	-.10296	-.05691	.24919	.11218
ACUITY5	.16106	-.11870	-.05325	.13371	-.14600	.09233	.19016	.10990
ACUITY6	.14987	-.06193	-.06480	.08947	-.07618	.23513	-.09338	-.11651
TOTACUIT	.28512	-.17088	-.12768	.17293	-.24093	.17390	.27303	.17452
DIRECT	.03991	-.12680	-.12349	.09708	.08428	.13195	.00111	.03903
PERSONAL	-.13974	-.07812	-.01943	-.04867	-.08885	-.02919	.13917	-.01081
OFFUNIT	-.12459	.35241	.03685	-.00860	-.03824	-.06146	-.06989	-.06146
COMMUN	-.05840	.08008	-.02452	.03265	-.03642	.02352	-.04581	-.11959
PREP	.03101	.03761	.08980	.04933	.07161	.05592	.03250	.09248
CLER	.01434	-.12039	-.14351	-.03901	-.00795	.05148	.10177	.04063
CON	.13373	.06527	-.03118	.05363	.00217	-.00032	-.01141	-.05545
TRAV	.03399	-.01602	.15542	-.07791	-.06436	-.08765	.10541	.04431
ADMIN	-.10994	.27906	.25946	-.03381	-.06458	-.00816	-.11802	.00143
ENVIR	-.06452	-.05236	.31206	-.02924	-.02916	-.06129	-.05282	.09948
WAIT	-.13244	-.06659	.02452	.01796	.13323	-.06435	-.10860	.02095
OFFDUTY	.25346	-.05517	-.05117	-.07375	-.05534	-.09561	-.06445	-.06456
DIR/TALL	.05490	-.11966	-.11609	.03139	.09131	.12394	-.01062	.01043
IND/ALL	-.07524	.12964	.12824	-.15132	-.04305	-.11523	-.01352	-.05453
RN	-.05474	.16513	-.19091	.40965	-.22442	.38859	-.41012	-.41279
LPN	.19195	-.11897	.26497	-.29515	-.14634	-.27998	.56921	.55972
STU	-.10657	-.05489	-.05743	-.13617	.67512	-.12917	-.12338	-.09904
ADMIN	-.14504	-.04776	.01663	-.11848	-.05874	-.11239	-.10735	-.11264
	AGENCY	M91STU	WARDCLK	VOLUNT	RESERVE	BEDNR	ACUITY1	ACUITY2
AGENCY	1.00000							

M91STU	-.08784	1.00000						
WARDCLK	-.10601	-.04828	1.00000					
VOLUNT	-.04770	-.02173	-.02622	1.00000				
RESERVE	-.05877	-.02677	-.03230	-.01454	1.00000			
BEDNR	.31816	-.22574	-.27686	-.12459	-.02574	1.00000		
ACUITY1	99.99999	99.99999	99.99999	99.99999	99.99999	99.99999	1.00000	
ACUITY2	.18127	-.01536	-.01854	-.00834	-.01028	.11757	99.99999	1.00000
ACUITY3	.00205	-.07631	-.09209	-.04144	.08712	.13066	99.99999	-.02930
ACUITY4	.01174	-.09646	-.11641	-.05238	-.06454	.12387	99.99999	.04498
ACUITY5	-.03686	-.10389	-.16507	-.07428	-.06365	.14055	99.99999	-.05253
ACUITY6	.10215	-.07137	-.08613	-.03876	.10302	.22052	99.99999	-.02741
TOTACUIT	.05144	-.22711	-.30844	-.13879	.00038	.40449	99.99999	.06795
DIRECT	.12483	-.00388	-.22954	-.10329	.00161	.20814	99.99999	.03790
PERSONAL	-.01703	.12709	.12391	-.05921	.11455	-.02327	99.99999	-.04187
OFFUNIT	.00122	-.03583	.13609	-.01946	-.02397	-.14243	99.99999	-.01376
COMMUN	.06746	.05832	.06477	-.06273	.05423	.02137	99.99999	-.04436
PREP	-.06897	-.10737	-.13165	-.07856	.03481	.09777	99.99999	-.05555
CLER	.01455	-.13697	.19300	.15719	-.07141	.03420	99.99999	.17985
CON	.02496	-.03239	-.12783	-.05752	-.01414	.10454	99.99999	-.04067
TRAV	-.10438	.00467	.09594	.31712	-.04035	-.06571	99.99999	-.02316
ADMIN	-.10682	-.06051	.14904	.02132	-.04048	-.16566	99.99999	-.02324
ENVIR	.02462	.05305	-.07282	-.03277	-.04037	.00682	99.99999	-.02317
WAIT	.01745	.19720	-.07520	-.05166	.03346	-.07430	99.99999	-.03653
OFFDUTY	-.10201	-.04082	-.01654	.08266	-.05290	-.17970	99.99999	-.03036
DIR/TALL	.14841	.01079	-.21923	-.09865	.00638	.21646	99.99999	.04037
IND/ALL	-.03884	.02850	.17540	.10046	.01975	-.19036	99.99999	-.01852
RN	.41780	-.21026	-.25374	-.11418	.12732	.35308	99.99999	.07307
LPN	-.30103	-.13710	-.13613	-.07445	-.09173	-.03242	99.99999	-.05265
STU	-.13888	.63253	-.03685	-.03435	-.04232	-.30333	99.99999	-.02429
ADMIN	-.12084	-.05504	.77943	.39477	.05038	-.30412	99.99999	-.02113

	ACUITY3	ACUITY4	ACUITY5	ACUITY6	TOTACUIT	DIRECT	PERSONAL	OFFUNIT
ACUITY3	1.00000							
ACUITY4	-.03364	1.00000						
ACUITY5	-.14741	-.21347	1.00000					
ACUITY6	-.10542	-.12974	-.19932	1.00000				
TOTACUIT	.13177	.39627	.53728	.32551	1.00000			
DIRECT	.02419	.09324	.22470	.23555	.41564	1.00000		
PERSONAL	-.00433	.10919	-.00012	-.03711	.04666	-.15039	1.00000	
OFFUNIT	-.06217	-.06939	-.05619	-.06392	-.15788	-.14734	-.06790	1.00000
COMMUN	-.08643	-.02297	-.01390	.03938	-.04220	-.20702	-.08546	-.05182
PREP	.08315	.02444	.04168	.06743	.12089	.05949	-.19382	-.09198
CLER	.06751	.08609	.10025	-.05605	.15070	-.11682	-.06922	-.12337
CON	-.05948	-.09251	-.07741	-.04173	-.18136	-.19923	-.16673	-.06955
TRAV	.04373	-.01760	.04491	-.06681	-.00167	-.15169	-.06859	-.03763
ADMIN	-.04600	-.05974	-.15438	-.05114	-.21997	-.22293	-.04454	.00665
ENVIR	.12395	.01933	-.02371	-.08393	-.01758	-.03354	-.03338	-.03499
WAIT	.00641	-.04189	-.07269	-.01521	-.10383	-.18714	-.08929	-.05919
OFFDUTY	-.06467	-.14755	-.19768	-.11049	-.36440	-.28847	-.19033	-.04525
DIR/TALL	.05186	.01215	.19741	.20599	.32799	.88767	-.12936	-.13986
IND/ALL	-.00285	-.16099	-.20394	-.17034	-.39458	-.79028	.17801	.14710
RN	-.05851	-.04477	.04118	.28982	.17049	.16247	-.07932	.05882
LPN	.15085	.19524	.15763	-.19144	.19797	-.07503	.07865	-.08864
STU	-.05745	-.13072	-.17377	-.11283	-.33054	.05291	-.00087	-.05665

ADMIN -.10497 -.13270 -.18100 -.09818 -.34472 -.24509 -.00006 .10634

	COMMUN	PREP	CLER	CON	TRAV	ADMIN	ENVIR	WAIT
COMMUN	1.00000							
PREP	-.11979	1.00000						
CLER	-.09936	-.13717	1.00000					
CON	-.02437	-.07495	-.21516	1.00000				
TRAV	.03209	-.01170	-.05685	-.12131	1.00000			
ADMIN	.03009	.03902	-.17061	.00366	.10460	1.00000		
ENVIR	-.07495	-.02777	-.12351	-.04377	.11100	.08297	1.00000	
WAIT	-.09774	-.11043	-.15805	-.03672	-.06462	-.10727	-.02129	1.00000
OFFDUTY	-.09192	-.21288	-.18770	.15997	-.06387	-.01170	-.10638	-.01531
DIR/TALL	-.19625	-.02913	-.09248	-.18070	-.15285	-.21851	-.02149	-.16793
IND/ALL	.18252	-.07353	.03630	.15430	.13628	.19485	.07369	.10051
RN	.11314	.00894	-.05678	.12292	-.22030	-.03754	-.09233	-.05250
LPN	-.14372	.09790	-.01189	-.05110	.15538	.02089	.13924	-.03167
STU	.00984	-.04815	-.08075	-.01179	-.05339	-.09566	.00222	.21598
ADMIN	.04389	-.13136	.21105	-.10197	.19991	.13577	-.08301	-.06846

	OFFDUTY	DIR/TALL	IND/ALL	RN	LPN	STU	ADMIN
OFFDUTY	1.00000						
DIR/TALL	-.17403	1.00000					
IND/ALL	.21516	-.64512	1.00000				
RN	-.08703	.14366	-.12634	1.00000			
LPN	.05196	-.07656	.03601	-.72051	1.00000		
STU	-.01275	.07846	-.01082	-.33241	-.21676	1.00000	
ADMIN	.08046	-.23346	.20100	-.26627	-.16402	-.08701	1.00000

CRITICAL VALUE (1-TAIL, .05) = + Or - .08925

CRITICAL VALUE (2-tail, .05) = +/- .10623

N = 341

Appendix E Workload Management
System for Nursing Staffing Tables

CRITICAL CARE
NURSING CARE HOUR REQUIREMENTS

PATIENTS	CATEGORY					
	I	II	III	IV	V	VI
31	43	143				
32	45	147				
33	46	152				
34	48	156				
35	49	161				
36	50	166				
37	52	170				
38	53	175				
39	55	179				
40	56	184				
41	57	189				
42	59	193				
43	60	198				
44	62	202				
45	63	207				
46	64	212				
47	66	216				
48	67	221				
49	69	225				
50	70	230				
51	71	235				
52	73	239				
53	74	244				
54	76	248				
55	77	253				
56	78	258				
57	80	262				
58	81	267				
	83	271				
	84	276				

"REPRODUCED AT GOVERNMENT EXPENSE"

CRITICAL CARE
NURSING CARE HOUR REQUIREMENTS

PATIENTS	CATEGORY					
	I	II	III	IV	V	VI
1	1	5	10	17	25	43
2	3	9	20	34	51	85
3	4	14	30	50	76	128
4	6	18	40	67	101	171
5	7	23	51	84	127	214
6	8	28	61	101	152	256
7	10	32	71	118	177	299
8	11	37	81	134	202	342
9	13	41	91	151	228	384
10	14	46	101	163	253	427
11	15	51	111	185	278	470
12	17	55	121	202	304	512
13	18	60	131	218	329	555
14	20	64	141	235	354	598
15	21	69	152	252	380	641
16	22	74	162	269	405	683
17	24	78	172	286	420	726
18	25	83	182	302	455	769
19	27	87	192	319	481	811
20	28	92	202	336	506	854
21	29	97	212	353	531	897
22	31	101	222	370	557	939
23	32	106	232	386	582	982
24	34	110	242	403	607	1025
25	35	115	253	420	633	1068
26	36	120	263	437	658	1110
27	38	124	273	454	683	1153
28	39	129	283	470	708	1196
29	41	133	293	487	734	1238
30	42	138	303	504	759	1281

REPRODUCED AT GOVERNMENT EXPENSE

CRITICAL CARE
PERSONNEL REQUIREMENTS CHART

TOTAL HOURS	TOTAL 24 HOUR STAFF	DAYS			EVENINGS			NIGHTS	
		RN	91C	91A	RN	91C	91A	RN	91C
0-48	6	1	1	0	1	1	0	1	1
49-56	7	2	1	0	1	1	0	1	1
57-64	8	2	1	0	2	1	0	1	1
65-72	9	2	1	0	2	1	0	2	1
73-80	10	2	1	1	2	1	0	2	1
81-88	11	2	1	1	2	1	1	2	1
89-96	12	2	1	1	2	1	1	2	1
97-104	13	3	1	1	2	1	1	2	1
105-112	14	3	1	1	3	1	1	2	1
113-120	15	3	1	1	3	1	1	3	1
121-128	16	4	1	1	3	1	1	3	1
129-136	17	4	1	1	4	1	1	3	1
137-144	18	4	1	1	4	1	1	4	1
145-152	19	4	2	1	4	1	1	4	1
153-160	20	4	2	1	4	2	1	4	1
161-168	21	4	2	1	4	2	1	4	2
169-176	22	5	2	1	4	2	1	4	2
177-184	23	5	2	1	5	2	1	4	2
185-192	24	5	2	1	5	2	1	5	2
193-200	25	5	3	1	5	2	1	5	2
201-208	26	5	3	1	5	3	1	5	2
209-216	27	5	3	1	5	3	1	5	3
217-224	28	6	3	1	5	3	1	5	3
225-232	29	6	3	1	6	3	1	5	3
233-240	30	6	3	1	6	3	1	6	3

"REPRODUCED AT GOVERNMENT EXPENSE"

CRITICAL CARE
PERSONNEL REQUIREMENTS CHART

TOTAL HOURS	TOTAL 24 HOUR STAFF	DAYS			EVENINGS			NIGHTS		
		RN	91C	91A	RN	91C	91A	RN	91C	91A
241-248	31	7	3	1	6	3	1	6	3	1
249-256	32	7	3	1	7	3	1	6	3	1
257-264	33	7	3	1	7	3	1	7	3	1
265-272	34	7	4	1	7	3	1	7	3	1
273-280	35	7	4	1	7	4	1	7	3	1
281-288	36	7	4	1	7	4	1	7	4	1
289-296	37	8	4	1	7	4	1	7	4	1
297-304	38	8	4	1	8	4	1	7	4	1
305-312	39	8	4	1	8	4	1	8	4	1
313-320	40	8	4	2	8	4	1	8	4	1
321-328	41	8	4	2	8	4	2	8	4	1
329-336	42	8	4	2	8	4	2	8	4	2
337-344	43	9	4	2	8	4	2	8	4	2
345-352	44	9	4	2	9	4	2	8	4	2
353-360	45	9	4	2	9	4	2	9	4	2
361-368	46	10	4	2	9	4	2	9	4	2
369-376	47	10	4	2	10	4	2	9	4	2
377-384	48	10	4	2	10	4	2	10	4	2
385-392	49	10	5	2	10	4	2	10	4	2
393-400	50	10	5	2	10	5	2	10	4	2
401-408	51	10	5	2	10	5	2	10	5	2
409-416	52	11	5	2	10	5	2	10	5	2
417-424	53	11	5	2	11	5	2	10	5	2
425-432	54	11	5	2	11	5	2	11	5	2
433-440	55	11	6	2	11	5	2	11	5	2

"REPRODUCED AT GOVERNMENT EXPENSE"

CRITICAL CARE
PERSONNEL REQUIREMENTS CHART

TOTAL HOURS	TOTAL 24 HOUR STAFF	DAYS			EVENINGS			NIGHTS		
		RN	91C	91A	RN	91C	91A	RN	91C	91A
441-448	56	11	6	2	11	6	2	11	5	2
449-456	57	11	6	2	11	6	2	11	6	2
457-464	58	12	6	2	11	6	2	11	6	2
465-472	59	12	6	2	12	6	2	11	6	2
473-480	60	12	6	2	12	6	2	12	6	2
481-488	61	13	6	2	12	6	2	12	6	2
489-496	62	13	6	2	13	6	2	12	6	2
497-504	63	13	6	2	13	6	2	13	6	2
505-512	64	13	7	2	13	6	2	13	6	2
513-520	65	13	7	2	13	7	2	13	6	2
521-528	66	13	7	2	13	7	2	13	7	2
529-536	67	14	7	2	13	7	2	13	7	2
537-544	68	14	7	2	14	7	2	13	7	2
545-552	69	14	7	2	14	7	2	14	7	2
553-560	70	14	7	3	14	7	2	14	7	2
561-568	71	14	7	3	14	7	3	14	7	2
569-576	72	14	7	3	14	7	3	14	7	3
577-584	73	15	7	3	14	7	3	14	7	3
585-592	74	15	7	3	15	7	3	14	7	3
593-600	75	15	7	3	15	7	3	15	7	3

REPRODUCED AT GOVERNMENT EXPENSE

Appendix F McKenna Memorial Hospital
Patient Care Cardex

MEDICATIONS TAKEN AT HOME

<input type="checkbox"/> INTERCOM	<input type="checkbox"/> VISITING HOURS
<input type="checkbox"/> BED HI/LOW	<input type="checkbox"/> MEAL TIME
<input type="checkbox"/> SIDE RAIL POLICY	<input type="checkbox"/> SMOKING
<input type="checkbox"/> RELEASE SIGNED	<input type="checkbox"/> TV
<input type="checkbox"/> TELEPHONE	<input type="checkbox"/> BR EMERGENCY LIGHT

VALUABLES INVENTORY

ITEM	Yes	No	DESCRIPTION
WATCH			
RING			
RING			
RING			
OTHER JEWELRY			
CASH			
OTHER			
OTHER			
IN SAFE			
WITH PATIENT			
SENT HOME WITH			
COMMENTS			
NURSE'S SIGNATURE			DATE

RELEASE STATEMENT

I UNDERSTAND THAT THE HOSPITAL IS NOT RESPONSIBLE FOR ANY VALUABLES REMAINING WITH THE PATIENT.

DATE _____

DATE OF FAMILY MEMBER _____

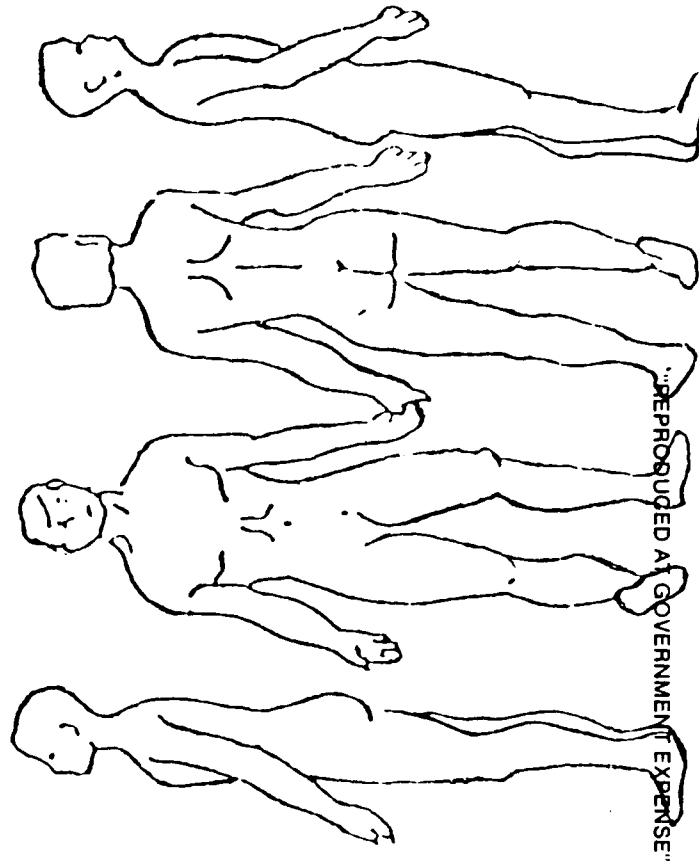
X

MEDICATIONS TAKEN AT HOME			
DRUG	DOSAGE	FREQ	TIME LAST DOSE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

DISPOSITIONS OF MEETS BROUGHT IN

NURSE'S SIGNATURE X

INDICATE LOCATION OF LESIONS, SCARS:



[illegible]

Appendix G McKenna Memorial Hospital
24 hour Critical Care Record

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